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MICHAUX, A.





QUERCUS,

OR

OAKS :

FROM THE FRENCH

OF

MICHAUX,

HISTOIRE DES CHÊNES

DE L'AMERIQUE SEPTENTRIONALE,

WITH NOTES

AND

AN APPENDIX.

BY

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IN IRELAND, &c. &c. &c.

—Δρυος ἔλυμα περιεδε γυνη. *Hesiod, E. 436.*

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P R E F A C E.

I AM induced to lay before the Society an account of the North American oaks, from the French of “*Michaux’s Histoire Des Chênes De L’Amerique Septentrionale*,” as I believe no full view or translation of this highly useful, valuable and elegant work, has yet appeared in English dress.

The very enlarged and interesting edition of Miller’s Dictionary, by Professor Martyn, lately published, takes no notice whatsoever of the N. American oaks, as arranged by Michaux and Willdenow, which circumstance appears to me somewhat extraordinary, as the former published his *Histoire Des Chênes*, in 1801;

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and the latter that part of his *Species Plantarum*, which treats of oaks, in 1805; whereas the part, which speaks of *Quercus* or Oaks, in Professor Martyn's *Miller* was published in 1807. By those observations I mean no slight whatsoever, nor would wish to be considered as insinuating any want of attention or industry on the part of the highly learned and respectable author, who perhaps has not seen the publications alluded to, or whose observations on oaks perhaps were printed off, before they fell into his hands; but merely to account and apologize for my presuming to take up a subject so interesting, and laying this translation before the Society.—Moreover, as professor and lecturer on botany to this valuable and useful body of noblemen and gentlemen, originally instituted for the purpose of encouraging agriculture, husbandry, and planting, I consider myself called upon, from motives of very high consideration, to miss no opportunity
of

of submitting to them, and through them (as has ever been the case) to the public, the earliest notice of every interesting fact, particularly such as has not appeared elsewhere, within the immediate views of the Society's grand establishment, and my particular province.

To this translation from the French of the elder Michaux, I have added most of the observations of his son in his "*Travels to the Westward of the Allegany mountains*," on the same subject, a subsequent work.

The remarks of Catesby, in his "*History of Carolina, &c.*" and others on American oaks, I have but slightly touched upon.

Willdenow's *Species Plantarum*, published at Berlin, a work I presume in the hands of but few, at least so far, as *Quercus* or Oaks reach, a publication of the very first rate authority, as to classic and systematic arrangement, besides afford-

ing a very comprehensive view of all the discoveries of the various celebrated modern authors, who have travelled in search of vegetable treasures to the remotest parts of the globe; I have so far abstracted from, as, I conceive, must satisfy the scientific botanical enquirer into the economy of the oak.

In an appendix I have noticed some other oaks, besides those which are to be met with in North America; to this I am led by their growing, and at present to be seen in the Society's Botanical garden at Glasnevin, interspersed with a great majority of the American oaks mentioned in this translation.

This trifling attempt must be considered as preliminary and introductory to a more enlarged work on oaks, particularly on such as are to be seen in the different plantations in this kingdom; of course I have reserved my sentiments at large on this subject, and the information

mation I have collected from the highest published authorities of the day, with a sincere hope that the noblemen and gentlemen of Ireland will furnish me with such interesting and faithful documents, as may enable me to lay before the public a full and true report of the different species, and varieties of oaks growing in Ireland; the soils on which they best succeed—the true mode of cultivating them—their age, height, and girth—whether raised from the acorn or otherwise—whether such as are called deciduous ever become evergreens, or, in other words, whether they occasionally assume the evergreen state—when they first produced fruit or acorns—if possible, the proportion of stameniferous or male flowers to the pistilliferous or female flowers—at what season of the year both were produced, and the fruit perfected—the number of stamina or male parts in each flower, would be interesting to ascertain

certain, and the number of acorns on each peduncle or fruit stalk, with their size, shape, and every thing remarkable attending them.

It is highly probable no great number of *species* of oaks have yet been cultivated in this kingdom, but my object is to ascertain the fact. The common oaks, as the *quercus robur*, or most common, the *quercus Ilex*, or evergreen oak, the *quercus gramuntia*, or holly-leaved oak, the *quercus Prinus*, chestnut-leaved oak, the *quercus Cerris*, Turkey oak, and a very few others, adorn many of our woods and plantations; but the cultivation of American oaks, and some others, which would endure our climate exceedingly well, is, I believe, but still in its infancy.

I have fully described the titles of the authors, to which I have referred, in order to induce the attention of those, who wish to enter assiduously into the subject. It may be asked, why I refer to a work on
insects?

insects? Because it gives beautiful and satisfactory coloured figures of the species of oak, on which the little creatures feed. I have, throughout, paid attention to plates, both coloured and plain, in the respective works within my research, many of which may be consulted in the Society's library; as I conceive good representations of the objects, as to their forms and appearances in their various stages of growth, must convey much more satisfactory information in this point of view, than any description whatsoever.

A list of the species of oaks growing in various parts of the globe, and known at the present day, I consider as interesting information; I have, therefore, subjoined the number of species, taken from, and arranged according to Willdenow, in the fourth volume of his *Species Plant.* p 423, &c. together with their habitats, or native places of growth.

The

The second edition of Duhamel's *Traité des Arbres et Arbustes*, with very considerable interesting additions, improvements, and highly finished and exact botanical representations of above two thousand species of trees and shrubs in their natural colours, by that admirable artist, M. Redouté remains still to be consulted on the subject of oaks, as only a few numbers have reached the Society's library, the oaks not included ; but from the specimen before us of this admirable work, much is to be expected on *Quercus*, or Oaks.

Dublin, December, 1808.

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INTRODUCTION.

IT is of very little consequence to estimate the utility of the oak according to ancient records, or whether mankind in the early ages lived upon the Acorn. It is very probable that the word, *Acorn*, was formerly a generic name, applied to different fruits. The Arabs called the date-tree *Tamar*, and to this they added a specific name, when they wished to distinguish it from other fruits; thus the Tamarin or Tamarind was called *Tamar Hendi*, the date of India, &c.

The Greeks made use of the word *Βαλανος* (*Balanos*) to signify the date, the chesnut, the acorn, and many other fruits, and the people employed in gathering such
fruits

fruits were called *Βαλανισται* (Balanistes). The Latins also used the word *Glans* as a generic name; the date was called *Glans Phœnicia*, the chesnut *Glans Sardiana*, the fruit of the walnut, *Jovis glans* or *Juglans*, &c.

In short, the Gauls called the fruit of many trees indiscriminately acorns, as the acorn of the oak, the beech, the walnut, &c. It is therefore to be presumed, that under the generic term acorn, dates, chesnuts, &c. have been formerly, as well as at the present day, preferred to the fruit of the oak, as the food of many nations.

Plutarch calls the Arcadians *Βαλανηφαγοι* (Balanephages) and observes that they were considered as invincible, because their principle food consisted of acorns. Without recurring to ancient history, I will admit that it is very probable, acorns might be eatable. It is certain that throughout the Morea and Asia Minor, a sort of acorn, fit to be eaten, is sold in
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their markets at the present day. Olivier, who some time since visited these countries, has ascertained the fact. Michaux says, that at Bagdad he eat the best acorns, that grew in Mesopotamia and Curdistan; they are as thick and as long as a man's finger; he also tasted of those which are eaten in Spain, and they appeared to be rather sweet. Desfontaines makes mention, in the Memoires of the Academy of Sciences, of the acorns of the *Quercus ballota* being good for eating. Michaux's object at present is to speak of the value of the oak as universally employed, and to make known the different species, which he observed in North America.

The oak grows naturally in every part of the temperate zone, in Europe, Asia, America, and even in Africa—its cultivation requires particular attention, transplanting, engrafting, and other means of reproduction, not being always favourable. Nature has particularly fitted the oak for

large forests ; it there towers with imperial dignity over every other vegetable, and supplies animals of different kinds with abundant food. In Europe, the stag, the roebuck, and the wild boar live during the winter entirely on the acorns, which they meet with in the woods—in Asia, pheasants and many of the feathered tribe share them with the fawns—in North America, the bear, the squirrel, the pigeon, the wild turkey, &c. seek with much industry for the acorn, and it has been observed that many species of animals of the continent of America, after having consumed the acorns of one territory, migrated in innumerable flocks into other countries, where the acorns were to be met with in greater abundance.

The oak, of all other trees, is that whose timber is employed the most, generally and usefully—it serves for building ships, houses, instruments for the various purposes of agriculture, &c.—it affords substances

stances used in medicine, its bark is almost indispensably necessary for the tanner, the dyer, &c. in short, it is the daily food for fuel so necessary to our existence.

There are many species of oak entirely unknown, and the majority of such as grow in America assume such a variety of forms in their young state, that they cannot be distinguished with certainty, but in proportion as the tree arrives at maturity. It seems as if nature wished to multiply the oak, and to render it of general advantage in causing different species to grow under the same latitudes, and accommodate themselves to the various degrees of temperature and soil—for the oak does not always grow in forests, neither does it invariably arrive to a great height; —there are countries which produce only dwarf oaks, as the Kermes oak, or *Quercus coccifera* of *Linnæus*, and some others, which are by their nature small; whilst others again, which grow on rocks, and
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the coasts of the Mediterranean sea, are generally stunted and of diminutive stature, occasioned only by the aridity of the soil, in which they have originally lodged themselves. Many varieties also exist, merely occasioned by accidental causes.—In N. America, dwarf stoloniferous or creeping oaks occur, whose multiplied shoots cover immense tracts of land.—The meadows situated in the midst of the forests of America are burned annually by the savages, and new inhabitants, who endeavour by this custom to produce a new herbage, with the view of attracting the fawns, and feeding cattle thereon—the forests themselves having caught fire in their turn, and the tall trees being destroyed, the horizontal roots of many species of oak, detached from the trunk, reproduce of themselves, and separately, shoots, which yield fruit afterwards at the height of two or three feet—each bundle or assemblage of these shoots on
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the same stock may be considered as a dwarf tree, or without a stem; for the fire, by consuming the trees down to the root, produces the same effect, which amputation of the stalk would do, or as lopping on the cultivated pear or other fruit trees, which otherwise would become tall trees, but by repeated operations of pruning remain dwarfs, and produce fruit bearing branches immediately near the root. Many travellers, from want of leisure to investigate these oaks with due attention, have considered them as a particular species, but those whose acorns were sown shot forth, as well as the others, a descending small root without producing shoots;—it is therefore highly improbable, that there are oaks naturally stoloniferous or creeping.

At the present day there are numerous varieties of the oak, and to determine the species, to which they ought to be referred, is attended with much difficulty—an intermediate

intermediate variety, in fact, seems to resemble two species so much, that it is frequently no easy matter, by the examination of the leaves, to determine to which of the two species this variety ought to be referred. Some species, liable to vary when young, are at this period so different, that the characters of the leaves are insufficient to determine the same species in the young oak, and the full grown one: many others, on the contrary, exhibit such an uniformity of character, that the specific distinctions can only be established on the fructification, which is itself subject to variations, and therefore exceptionable. It is by comparative observations only, on oaks in their full grown state, and when they are young, that we can succeed in distinguishing the species, which have so great an affinity to one another, and to refer the varieties to their species.

The oaks of North America have hitherto been but obscurely described, owing to
many

many reasons. In the first place, botanists, who have visited North America, give but loose and hasty observations on these trees, and besides have paid no attention whatsoever to the fructification—and secondly, by this slovenly mode of proceeding, authors have too frequently confounded many species under one and the same denomination. In short, the plates which have appeared, of the American oaks cultivated in Europe, are by no means exact, because their growth in Europe is retarded by the climate, which is less favourable to them than that of their native country; and besides, they there preserve for a longer time the varieties of their foliage, which characterize them in their young state of growth. *

Michaux, in order to satisfy himself, and clear up his doubts, sowed and cultivated,

* Many of the figures of Du Roi, and Plucknet, pl. liv. fig. 5. represent oaks, which had not acquired their full grown state.

vated, during his residence in North America, all the species he observed and collected; and on the second year, he had the satisfaction to discover all the varieties, which had occasioned him so many uncertainties, when he wandered over the forests. By paying much attention to the changes which certain species assumed, until they arrived to their full growth, he discovered, in the very young trees, the characteristic marks of their species; and it was thus that Michaux obtained a knowledge of the relations which arise amongst them. In order to assimilate them, he profited by the means, which nature herself seemed to furnish him with: but if, on one side, the follower of nature succeeds, by the assimilation of their species, to connect them together, on the other hand, he finds himself much puzzled when it is requisite to determine each species, and to assign peculiar and distinctive characters.

Michaux

Michaux endeavoured to arrange the different species of North American oaks in a natural order; and with this intention, he first supposed that the parts of fructification would supply him with characters, sufficient to establish this natural order; but none of them afforded him the means; and he discovered only distinctions of very little importance, such as their attachments being sometimes nearly sessile, sometimes pedunculated; the size of the acorn and its cup, the different periods of maturity, &c. Neither was it in his power to establish a sufficient distinction on the structure of the cup of the acorn. He then made his observations on the leaves, and they seemed to afford him more striking characteristics, and Michaux has therefore used them, in order to establish two sections of oaks. The first section contains such species as have awnless leaves, or, in other words, which have no bristly points: the second, those
with

with leaves, whose points or indentations are terminated by a bristle or awn.

The interval of time which elapses, from the appearance of the flower, and the ripening of the fruit, is not the same in every species of oak. This circumstance, which Michaux at first considered as insufficient to establish the two principal sections, has nevertheless appeared to him, to be of sufficient importance, to admit it as a secondary character.

It is well known that every species of oak is monoicous, and that in the *Quercus Robur*, or common oak, and in many other species, the male flowers are situated on the young branches which grow in the spring, and that the female flowers are disposed on the same branches, above the male flowers. It is also known that both are axillary, and that, immediately after the impregnation of the pistilliferous, or female flowers, the stameniferous, or male flowers wither and fall, whilst

whilst the females continue to grow, and arrive, in the course of the same year, to a perfect state of maturity, by ripening their fruit. This is the usual course ; however, it is not the case with many species of oaks, in which the female flowers are seen to appear in the spring, and remain an entire year without perfecting their fruit. It is to be presumed that they are not fertilized the first year, since it is only after the second spring they increase in bulk, and arrive at maturity. Here then is an interval of eighteen months, from the appearance of the flower until the perfection of the fruit. These considerations then have afforded Michaux two secondary divisions—the one comprehending the species which he calls the *annual fructification*, that is to say, for which the usual space of six months is sufficient for the perfection of the fruit—the other contains the species whose fructification is *biennial*, that is to say, whose fruit does
not

not ripen, until the expiration of eighteen months. It must be remarked that, when the fructification is annual, it remains always axillary, whilst in the biennial species it is not so, but only the first year: but on the second year, and when the leaves fall, it is necessarily found isolated or standing by itself. CLUSIUS has made this remark respecting the *Quercus cerris* of Linnæus, whose fructification is biennial; he expresses himself thus: “*Flores racematim compactos, ut quercus, è quibus uti nec in quercu nascuntur caliculi, sed ii brevi crassoque pediculo, annotinis ramulis adhærent, non in foliorum alis, omnino hispido,*” &c. CLUS. *Hist. Pl. Rar.* pag. 20.

Those whose fructification, though biennial, and remaining always axillary, must be excepted, because the leaves do not fall, such as the *Quercus coccifera* of Linnæus, and the *Quercus virens* of Aiton. Michaux also observes, that in the ancient continent oaks of a biennial fructification

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are to be found, as the *Quercus cerris*,
Quercus Ægilops, *Quercus coccifera*, of Lin-
næus; *Quercus pseudosuber* of Desfon-
taines, &c.



AMERICAN OAKS.



QUERCUM AMERICANARUM.

DISPOSITIO METHODICA.*

FOLIIS
ADULTÆ PLANTÆ
MUTICIS.
Fructus pedunculati.
Fructificatio annua.
(in specie 6^a. biennis.)

FOLIIS
ADULTÆ PLANTÆ
SETACEO-MUCRONATIS.
Fructus subsessiles.
Fructificatio biennis.

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|---|---------------------|--|----------------------|--|
| } | lobatis..... | 1. QUERCUS obtusiloba. | | |
| | | 2. Q. — Macrocarpa, | | |
| | | 3. Q. — lyrata. | | |
| | | 4. Q. — alba: <i>pinnatifida.</i>
— <i>repanda.</i> | | |
| | dentatis | 5. Q. <i>Prinus: palustris.</i>
— <i>monticola.</i>
— <i>acuminata.</i>
— <i>pumila.</i>
— <i>tomentosa.</i> | | |
| | | integris | 6. Q. <i>virens.</i> | |
| | | | integris..... | 7. Q. <i>Phellos; sylvatica.</i>
— <i>maritima.</i>
— <i>pumila.</i>
8. Q. <i>cinerea.</i>
9. Q. <i>imbricaria.</i>
10. Q. <i>laurifolia.</i>
Q. — <i>obtusifolia.</i> |
| | | breviter lobatis, | | 11. Q. <i>aquatica.</i>
12. Q. <i>nigra.</i>
13. Q. <i>tinctoria: angulosa.</i>
— <i>sinuosa.</i> |
| | profunde multiidis. | | | 14. — <i>triloba.</i>
15. Q. <i>Banisteri.</i>
16. Q. <i>falcata.</i>
17. Q. <i>Catesbæi.</i>
18. Q. <i>coccinea.</i>
19. Q. <i>palustris.</i>
20. Q. <i>rubra.</i> |

* WILLDENOW Sp. Plant. vol. 4. p. 423, &c. enumerates 76 species of oak—the arrangement differs more or less from that of MICHHAUX's; as follows, noticing here only the North American species as observed and mentioned by Michaux.

† *foliis integerrimis*, with leaves very entire.

1.	Quercus	Phellos.	Willd.	Quercus	Phellos; <i>sylvatica.</i>	Michaux.
2.	—	maritima	—	—	maritima,	—
3.	—	sericea	—	—	pumila,	—
5.	—	virens	—	—	virens,	—
6.	—	cinerea	—	—	cinerea,	—
12.	—	laurifolia	—	including the two varieties of Michaux.		
13.	—	imbricaria	—	Quercus	imbricaria,	—

†† *foliis dentatis*; with leaves toothed.

40.	Q.	Prinus,	Willd.	Q.	pinus; <i>palustris,</i>	Michaux.
41.	—	Prinoides,	—	—	pumila,	—
42.	—	montana,	—	—	monticola,	—
43.	—	bicolor,	—	—	tomentosa,	—
44.	—	castanea,	—	—	acuminata,	—

††† *foliis apice lobatis*; with leaves lobed at their extremities.

45.	Q.	aquatica,	Willd.	Q.	aquatica,	Michaux.
46.	—	nigra,	—	—	nigra,	—
47.	—	triloba,	—	—	triloba,	—

†††† *foliis sinuatis lobis mucronatis*; leaves sinuated, lobes bristled.

49.	—	hemisphærica,	Willd.	Q.	aquatica varietas,	Michaux.
50.	—	elongata,	—	—	falcata (<i>exclisus synonymis</i>)	—

METHODICAL ARRANGEMENT OF AMERICAN OAKS.

LEAVES in THE FULL GROWN TREE, without <i>aristæ, beards or awns, or bristles.</i> Fruit pedunculated. Fructification annual, (except sixth species which is biennial)	lobed or the margins of the segments rounded.	* 1. <i>q. obtusifolia</i> , upland white oak, iron oak. 2. <i>q. macrocarpa</i> , over-cup white oak. * 3. <i>q. lyrata</i> , water white oak. * 4. <i>q. alba: pinnatifida</i> , white oak. ———— <i>repanda</i> , sinuated white oak. * <i>q. prinus: palustris</i> , swamps chesnut oak ———— <i>monticola</i> ; mountain ches- nut oak; rocky oak. ———— <i>acuminata</i> , narrow live chesnut oak. ———— <i>pumila</i> , Chinquapin oak. ———— <i>tomentosa</i> , downy ches- nut oak.
	toothed, be- set with pro- jecting hori- zontal rather distant teeth of its own substance.	* 6. <i>q. virens</i> , live oak. * 7. <i>q. phellos</i> , sylvatica willow oak * <i>q. ————maritima</i> , sea wi- low oak. ———— <i>pumila</i> , dwarf willow oak 8. <i>cinerea</i> , upland willow oak. 9. <i>imbricaria</i> , shingles willow oak 10. <i>q. laurifolia</i> , swamp's willow oak. ———— <i>obtusiloba</i> .
	entire.	* 11. <i>aquatica</i> , water oak. * 12. <i>q. nigra</i> , black oak. * 13. <i>q. tinctoria</i> ; <i>angulosa</i> , great black oak, Champlain black oak, <i>Quercitron</i> oak. ———— <i>sinuosa</i> , sinuated <i>Quercitron</i> oak.
	entire.	* 14. <i>q. triloba</i> , downy black oak. * 15. <i>q. Banisteri</i> , running downy or <i>Banisters</i> oak. * 16. <i>q. falcata</i> , downy red oak. 17. <i>q. Catesbæi</i> , sandy red or <i>Catesby's</i> oak. * 18. <i>q. coccinea</i> , scarlet oak. * 19. <i>q. palustris</i> , swamp's red oak. * 20. <i>rubra</i> , red oak.
LEAVES in THE FULL GROWN TREE with <i>bristly points.</i> Fruit almost sessile or not quite destitute of a peduncle, or fruit stalk. Fructification biennial.	slightly lobed,	
	deeply slit, cut, or jag- ed.	
51. — <i>tinctoria</i> , 52. — <i>discolor</i> , 53. — <i>rubra</i> , 54. — <i>coccinea</i> , 55. — <i>Catesbæi</i> , 56. — <i>palustris</i> , 59. — <i>ilicifolia</i> ,	———— ———— ———— ———— ———— ———— ————	— <i>tinctoria</i> ; <i>angulosa</i> , — ————— <i>sinuosa</i> , — <i>rubra</i> , — <i>coccinea</i> , — <i>Catesbæi</i> , — <i>palustris</i> , — <i>Banisteri</i> ,
++++ <i>foliis sinuatis, lobis muticis</i> ; leaves sinuated, lobes without bristles. 62. <i>Q. alba</i> , Willd. <i>Q. alba</i> , Michx. 71. — <i>stellata</i> , 72. — <i>lyrata</i> , 73. — <i>macrocarpa</i> ,	———— ———— ———— ———— ————	— <i>obtusiloba</i> , — <i>lyrata</i> , — <i>macrocarpa</i> ,

Numbers 1, 2, 3, &c. refer to the individual species in WILLDENOW.

* In the Botanical Garden, Glasnevin.

CHARACTER GENERICUS.

QUERCUS. *Tournefort. Linnæi.*

FLORES	Sexu distincti in eadem stirpe.
* MASCULI	amentacei; amenta axillaria, longa, pendula, floribus supra axim filiformen interrupte glomeratis; sæpius fasciculata.
CALYX	monophyllus, membranaceus, 4-5 fidus.
STAMINA	4-10, filamentis ex imo calyce enatis, exertis; antheræ didymæ.
** FEMINEI	solitarie aut gregatim sessiles in fulero pedunculiformi, modò brevissimo, modò plus minus elongato, ex superiorum foliorum axillis enascente.
INVOLUCRUM	coriaceum, supra connivens, superstite foramine, limbo subintegrum, uniflorum, persistens.
CALYX	superus, plerumque 6-dentatus, dentibus styli basin arcte cingentibus, persistentibus.
OVARIUM	inferum, triloculare, ovulis in singulo loculo geminis; stylus unicus, brevis, stigmata tria reflexa.
FRUCTUS	glans ovata aut globosa, coriacea, non dehiscens, hilo lato no-

GENERIC CHARACTER

OF OAK.

FLOWERS of distinct sexes on the same tree.

* MASCULINE amentaceous; the amenta or catkins axillary, long, pendulous, with flowers above the filiform axis, interruptedly glomerous, or gathered into small round heads, oftentimes fasciculated.

CALYX of one leaf, membranaceous, 4 or 5 cleft.

STAMENS from 4 to 10, filaments arising from the bottom of the calyx, standing out; anthers didymous.

** FEMININE flowers solitary, or in sessile groups, on a peduncle-formed appendage, sometimes very short, at other times more or less elongated, springing out of the axilla of the superior leaves.

INVOLUCRUM leathery, connivent above, remaining with a hole, the limbus or edge almost entire, of one flower and persistent.

CALYX superior, for the most part six-toothed, the teeth closely surrounding the style at its base, persistent.

OVARY inferior, three-celled, the little seeds in each cell by twos, three reflexed stigmas.

FRUIT *acorn* ovate or globular, leathery, not
dehiscant

CHARACTER GENERICUS.

tata; cincta involucro, persistente
(*cupula*) in craterem expanso, in-
tus levi, extus tuberculoso, aut
squamoso; uniloculariis, mono-
sperma, (loculis et seminibus abor-
tivis) rarissime 2-3 sperma.

SEMEN

pericarpio conforme, absque pe-
rispermo, bilobum, lobis crassis;
radicula supera.

ARBORES aut FRUTICES. *Folia* alterna, stipula-
cea, stipulis plerumque minimis
caducis simplicibus; decidua aut
sempervirentia; vernalia pubescen-
tia, mollia; autumnalia coriacea,
sæpius glabra.

GENERIC CHARACTER.

dehiscent or gaping, marked with a broad eye or hilum; surrounded by the persistent involucre, which forms an expanded cup, internally smooth, externally tuberculated or squamous; one-celled and a solitary seed, (the rest of the cells and seeds are abortive) very rarely from two to three seeds.

SEED the same shape as the ovary, without a *perisperm*, two lobed, lobes thick: radicle ascending.

TREES or SHRUBS. Leaves alternate, stipulateous; the stipuli, or leafy appendages, for the most part very small, caducous, or falling off soon, simple: deciduous, or evergreen; in the spring pubescent and soft; in the autumn leathery, more frequently smooth.

1. QUERCUS

1. QUERCUS OBTUSILOBA.

QUERCUS foliis subtomentosis, profunde sinuata lobatis, foliis retusis; basi acute cuneata: fructu mediocri; cupela craterata; glande brevi ovata. Tab. 1. *Michaux*.

Wangenheim, p. 78. t. 6. f. 15.*

ARBORETUM, HORTUS GLASNEVINENSIS.

Chêne obtusilobe. Chêne gris.

Upland white oak, iron oak.

HEIGHT: about 50 feet.

TRUNK: straight: bark whitish; branches regular.

FRUCTIFICATION. *Male flowers*: catkin or amenum sometimes very short. *Female flowers*.

Three or four on the same peduncle, or fruit-stalk; cup nearly hemispherical; gland or acorn of a middling size.

COUNTRY. From Canada and New England to Florida,

* *QUERCUS stellata*. Willd. Sp. Pl. v: 4. p. 452. spec. 71. *Q. foliis oblongis sinuatis subtus pubescentibus, lobis obtusis, superioribus dilatatis bilobis, calycibus fructus hemisphæricis.* W.

Florida, and under the same latitudes to the west of the Allegany mountains.

OBSERVATIONS,

This tree seldom grows in low or moist situations, and its fruit is always abundant: wild animals seek for its acorns, and all the pedunculated species, besides those which are annual. Its wood is valued for all economical purposes, and it is preferred to all others, for stakes and palisades, as it does not rot for a length of time; it is also employed in the building of houses, ships, &c.

The Americans in general call this species, and the *Quercus alba* of Linnæus, *white oak*, because both have a whitish bark; but they well know how to distinguish one from the other, when they wish to apply them to the different purposes peculiar to each. Many authors have confounded these two oaks with the *Quercus robur*, or common oak, and which they resemble much in the shape of their leaves, the form of the fruit, and even the quality of the wood. *Clayton*, *Gronovius*, and *Marshal* appear to be well acquainted with the distinction, and *Wangenheim* has most satisfactorily distinguished the two species, and given an exact figure of each.

2. QUERCUS

2. QUERCUS MACROCARPA.

Quercus foliis subtomentosis, profunde lyratimque sinuato-lobatis, lobis obtusis, subcrenato repandis: fructu maximo: cupula profundius craterata, superne crinita: glande turgida ovata. Tab. 23. *Michaux.* *

Chêne Frisé. Chêne à gros fruit.

Over-cup White Oak.

HEIGHT: from 50 to 80 feet.

BARK smooth, and but little cracked, even in the adult state.

LEAVES lyrated, and of a bright colour: sinuses deep, and lobes obtuse, and as it were crenated; much larger than those of the preceding

* WILLDEN. Sp. Pl. v. 4. 453. Spec. 73.

Q. foliis oblongis sinuatis subtus pubescentibus, lobis oblongo-lanceolatis acutis, superioribus dentatis, calycibus fructus hemisphæricis squamosis margine setosis. W.

Michaux the younger observes, that this oak is the only species which ever grows in the most fertile districts of East Tennessee, or Holston; and which last place is inferior in every respect to Cumberland and Kentucky in fertility. However he found it growing in cool mountainous places, and by the sides of the rivers, which have not steep banks, at Kentucky and Cumberland, with acorns as large as a hen's egg. The state of Kentucky is situated between $36^{\circ} 30'$ and $39^{\circ} 30'$ of latitude, and between the 82° and 89° of longitude.

ing species, of a dark green, and less rough to the touch; with petioli, or leaf-stalks, much longer.

FRUCTIFICATION. Fruit very large: cup deep and hairy near its edge: acorn oval; sometimes more swelled; shut up in its cup, before it becomes ripe: peduncle, or fruit-stalk rather long.

COUNTRY. All the countries to the west of the Allegany mountains, Kentucky, Tennessee, Illinois, &c.

OBSERVATIONS.

This oak yields wood of a good quality, when it grows in elevated clays, and calcareous soils, as those of Kentucky and Tennessee; but in marshy grounds it appears weakly, and covered with lichens. Michaux seems to think, that in such situations the wood is not good, and its growth is retarded. Its young branches are covered with a fungous-like substance, like those we meet with on the elm, and liquidamber, which disappears in proportion as they become more full grown. There are found under the leaves of this species of oak small galls, in shape like lentils, and very hairy, and also very large ones, like the galls of other oaks, but they are light, membraneous, and empty; yet ink can be made of them.

3. QUERCUS

3. QUERCUS LYRATA. *Walter.*

Quercus foliis subsessilibus, glabris, lyrato-sinuatis; summitate dilatata, divaricato-triloba: lobis acutangulis, terminali tricuspide: cupula depresso-globosa, muricato-scabrata: glande subtecta. Tab. 4. *Michaux.* *

ARBORETUM, HORTUS GLASNEVINENSIS.

Chêne Blanc Aquatique. Chêne lyre.

Water white Oak.

HEIGHT: from 50 to 60 feet.

BARK smooth, young trunk, and flexible branches.

LEAVES of a pleasant green, entirely smooth and lyrated; lobes rather square, with sharp angles, the terminal lobe furnished with three points; sinuses very obtuse: petiolus, or leaf-stalk short.

FRUCTIFICATION. Cup of a middling size, almost spherical, aristated, or bristled with sharp tubercles,

* Willd. Sp. Pl. v. 4. 453. Spec. 72.

Q. foliis oblongis sinuatis glabris, lobis oblongis acutis, superioribus dilatatis angulato truncatis, calycibus fructus nucis magnitudinis globosis tuberculoso-muricatis.

Michaux the younger notices this species but once in his Travels, growing in the Pine Barrens, or swamps in Carolina and Georgia.

bercles, and surrounding almost entirely the acorn: peduncle sometimes very short.

COUNTRY. South Carolina and Georgia, where the country is frequently deluged by the great rivers.

OBSERVATIONS.

Michaux always observed this oak in watery situations, or such as were exposed to inundations. Though, when he cultivated it in a dry soil, it has surpassed, by the rapidity of its growth, most of the other species, which were reared in the same nursery.

4. QUERCUS ALBA, (*pinnatifida*) Linnæus.

*Quercus foliis subæqualiter pinnatifidis; lacinii oblongis, obtusis, plerumque integerrimis. Fructu majusculo; cupula craterata, tuberculosa-scabrata; glande ovata. Tab. 5. f. 1. Michaux.**

Wangenheim, p. 12. t. 3. f. 6. Catesby's Carolina,

* Willd. Sp. Pl. v. 4. 448. Spec. 62.

Q. foliis oblongis pinnatifido-sinuatis subtus pubescentibus lobis lineari-lanceolatis, obtusis integerrimis, basi attenuatis, calycibus fructus pedunculatis, tuberculis basi planis. W. Gaudet foliis profunde pinnatifido-sinuatis, lacinii æqualibus, subtus glaucis pubescentibus. W.

rolina, &c. v. 1. p. 21. t. 21. f. 2. * Du Roi, Harb. 2. p. 270. t. 5. f. 5.

ARBORETUM, HORTUS GLASNEVINENSIS,

Chêne Blanc à feuilles pennatifides.

White Oak.

HEIGHT: about 60 feet.

BARK whitish, detaching itself in longitudinal layers, as the tree becomes old.

LEAVES almost uniformly winged, obtusely indented, often entire, smooth and glaucous green underneath.

FRUCTIFICATION. *Male flowers*: from five to ten stamina. *Female flowers*: one or two on each peduncle. Cup almost hemispherical, and tuberculated; acorn oval, rather large; peduncle sometimes very short.

COUNTRY. From Canada to Florida.

OBSERVATIONS.

Catesby long since observes, that this species of oak comes nearest to our common English oak, in the shape of its leaves, acorns, and manner of growth. The bark is white, grain of the wood fine, for which, and its durability, it is esteemed the best oak in Virginia and Carolina. It grows on all kinds of land, but mostly on high, barren grounds, amongst high pine trees. There is another variety of white oak, which in Virginia is called the *Scale's White Oak*, with leaves like this: the bark is white and scaly; the wood of great use in building; grows on rich land, both high and low. *Catesby*. l. c. Michaux jun. mentions it as growing in most parts of America, in various soils.

OBSERVATIONS.

We may compare this species to the European oak with long peduncles, and from which it differs but little, in the form of its leaves, the acorn, and even the quality of the timber. In America it is preferred to all others, for the building of ships and houses; in fact, it answers for all economical purposes. It affords excellent timber for making hogsheads, for holding spirituous liquors; whereas, those which are made of red, and many other species of oak, are only fit for dry merchandize; moreover, the elasticity of the fibres of the white oak is such, that baskets and brooms are made of it. Of all the American oaks, this is the species best known time immemorial. Parkinson tells us, that the Indians boil the acorns, and get an oil from them, which they use in various ways, in preparing their food; in fact, it is very sweet.

QUERCUS ALBA, (*repanda*), Tab. 5. f. 2.
Michaux. *

Chêne Blanc à feuilles sinuenses.

This variety of white oak is frequently to be met with, in the forests of Carolina. Its leaves
are

* Willd. Sp. Pl. v. 4. 449. Q. alba, v. β. *repanda*, foliis levissime lobatis, utrinque viridibus, subtus pubescentibus brevissime sinuatis. W.

are sinuated, or sinulated; and in this state it is to be seen in the plantations of foreign trees, in France. Du Roi's Figure, pl. 5. f. 5. may be referred to.

5. QUERCUS PRINUS. *Linn.*

Quercus foliis oblongo-ovalibus, acuminatis acutisve, subuniformiter dentatis, deciduis: cupula craterata, subsquamosa; glande ovata.*

1. QUERCUS PRINUS (*palustris*).

Foliis longiuscule petiolatis, ovalibus: fructu magno; cupula modice concava, conspicuesquamosa. Tab. 6. *Michaux.* Catesby's Carolina, &c. v. 1. p. 18. t. 18. † Du Roi, Harb. 2. p. 276. c. 6. f. 3.

* Willd. Sp. Pl. v. 4. 439. Spec. 40. *Q.* foliis ovatis acutis subtus pubescentibus grosse dentatis, dentibus subæqualibus, dilatatis apice callosis, calyce fructus basi attenuato, nuce ovato. W.

† This oak grows only in low and very good land, and is the tallest and largest of the oaks in these parts of the world: the bark is white and scaly, grain of the wood not fine, though the timber is of great use. *Catesby*, l. c.

Michaux jun. states that this oak, with the *Magnolia grandiflora*, *Nyssa biflora*, &c. grow only on the river swamps, in the *Pine Barrens or Swamps*, in the Carolinas and Georgia, the soil of which is of a good quality, and always fresh humid and shaded. And again, in the districts, where there are no pines, the

f. 3. Wangen. 15. 6. 4. f. 8. Du Hamel. Arb. 18.

ARBORETUM, HORTUS GLASNEVINENSIS.

Chêne Chataignier (*des swamps*).

Swamp's Chesnut Oak.

HEIGHT : from 70 to 90 feet.

BARK whitish, detaching itself in longitudinal layers, when the tree becomes old.

LEAVES with rather long footstalks, inversely egg-shaped, bristly in the spring, smooth during the summer, sometimes tomentous or downy in old trees.

FRUCTIFICATION. Stamina from five to ten. Fruit large. Cup a little concave, very scaly. Peduncles or fruitstalks very short.

COUNTRY. The lower parts of the two Carolinas, Georgia, Florida, in moist and very shady forests.

OBSERVATIONS.

This is one of the loftiest oaks, which grows in the southern part of the United States. It is remarkable for the beauty of its form, and the large size of its acorns, which are pleasant and abundant, and of course much sought after by wild

the soil is not so arid, but deeper and more productive, this chesnut oak, with the white and aquatic oaks, are found.

He mentions a variety of this oak, *Quercus prinus aquatica*, not noticed in his father's '*Histoire des Chênes de l'Amerique Septentrionale*.'

wild beasts, but particularly by hogs, who live the whole year almost in the forests. The wood is excellent, and very much employed in cartwright work; and it may be divided to such a degree, that the Americans make baskets and brooms of it.

2. QUERCUS PRINUS (*monticola*). *

Foliis brevi petiolatis, subrhombico ovalibus; fructu majusculo; cupula turbinata, scabrosa; glande oblonga. Tab. 7. *Michaux*. Abbott's Insects, v. 2.p. 163. t. 82.

Chêne Chataignier (*des montagnes*.)

Mountain Chesnut Oak, Rocky Oak.

HEIGHT: from 40 to 50 feet.

LEAVES glaucous underneath; nearly rhomboidal.

FRUCTIFICATION: from 5 to 10 stamina; cup turbinated, obtusely dentated, and the stalk short; acorn oblong, and tolerably large.

COUNTRY. From the state of Massachusetts to Virginia, and in both the Carolinas, on the high mountains.

OBSERVATIONS.

* *Quercus montana*, Willd. Sp. Pl. v. 4. 440. spec.

Q. foliis obovatis, acutis, subtus albo-tomentosis grosse dentatis, dentibus subæqualibus dilatatis apice callosis, calycibus fructus subhemisphæricis, nuce ovata. W.

The younger Michaux states, that this variety is found in the arid and mountainous lands, in the east of Kentucky and Cumberland.

OBSERVATIONS.

The acorns are very abundant—the wood is as good as the white oak, and the bark is highly esteemed amongst tanners. It grows abundantly on the highest mountains : cultivated in Europe, it might turn to good account.

3. QUERCUS PRINUS (*acuminata*).

Foliis longe petiolatis, basi obtusis, acutissime serratis; fructu mediocri; cupula subhemisphærica. Tab. 8. *Michaux.* *

Chêne Chataignier (*des Illinois.*)

Narrow live Chesnut Oak.

HEIGHT : from 70 to 80 feet.

LEAVES smooth and glaucous, sometimes whitish, with a lengthened footstalk, and at the base obtuse and sharp-toothed.

FRUCTIFICATION. Ten stamina, sometimes less.

Peduncle shorter than in the former variety; fruit of a middling size; cup small, nearly hemispherical.

COUNTRY. All to the west of the Allegany mountains.

OBSERVATIONS.

* *Quercus castanea*. Willd. Sp. Pl. v. 4. 441. spec. 44.

Q foliis oblongo-lanceolatis, acuminatis subtus tomentosis, grosse dentatis, dentibus subæqualibus, dilatatis apice callosis, calyce fructus hemisphærico, nuce ovata. W.

OBSERVATIONS.

The different varieties of the chesnut oak, particularly this and the last, unite many qualities. The wood is excellent, acorns sweet, and the bark much employed in tanning. The degree of heat of the lake Ontario, and the Alleghany mountains, where they grow, being the same as the north of Europe, it would be attended with advantage to cultivate them there.

4. QUERCUS PRINUS (*pumila.*)

Foliis modice petiolatis, sublanceolatis, subtus glaucis: fructu præcedentis. Tab. 9. f. 1. *Michaux.* *

Chêne Chinquapin.

Chinquapin Oak.

HEIGHT: about three feet.

LEAVES glaucous, sublanceolate, and the stalk short.

d 2

FRUCTIFICATION.

* *Quercus Prinoides*. Willd. Sp. Pl. v.. 440. spec. 41.

Q. foliis obovatis glabris grosse dentatis, dentibus subæqualibus dilatatis apice callosis, calyce fructus hemisphærico, nuce ovata. W.

The younger Michaux found, at the bottom of the high mountains, which separate N. Carolina from the State of Tennessee, leaving Knoxville, the soil is uneven, stony and bad a great abundance of this Chinquapin oak, and which, he observes, seldom grows higher than three feet; and some of them were so loaded with acorns, that they were bent down to the ground.

FRUCTIFICATION. The fruit the same as the former.

COUNTRY. The western parts of Virginia and Carolina.

5. QUERCUS PRINUS (*tomentosa*).

Foliis subsellibus, ovalibus, dentibus obtusissimis, subtus tomentosis. Tab: 9. f. 2. *Michaux*. *

ARBORETUM, HORTUS GLASNEVINENSIS.

Chêne Chataignier' (*velu*).

Downy Chesnut Oak.

OBSERVATIONS.

This variety grows abundantly in the Illinois country in an immense watery plain. The leaves are very woolly, oboval, with very obtuse teeth, the leafstalk very short; the acorns sweet, and fit to be eaten. There grows in lower Virginia a chesnut-leaved oak like this, which Michaux saw only at the end of winter. This variety, perhaps, is the chesnut-leaved oak, which is cultivated in France, whose leaves also are very woolly, but much sharper at the base.

QUERCUS VIRENS. Aiton.

Quercus foliis perennantibus, coriaceis: ovato
oblongis;

* *Quercus bicolor*. Willd. Sp. Pl. v. 4. 440. spec. 43.

Q. foliis oblongo-obovatis, subtus albo-tomentosis, grosse dentatis, dentibus inæqualibus dilatatis, apice callosis, fructibus geminatis longe pedunculatis. W.

oblongis; junioribus dentatis, vetustioribus integris; cupula turbinata; squamulis abbreviatis; glande oblonga. Tab. 10. & 11. *Michaux.* *
Catesby's Carolina, &c. v. 1. p. 17. t. 17. †

ARBORETUM, HORTUS GLASNEVINENSIS.

Chêne verd de Caroline. Chêne maritime.

Live Oak.

HEIGHT: from 35 to 40 feet.

BARK brown or blackish; but little cracked.

LEAVES persistent, coriaceous or leathery, entire, oval or oblong, and a little obtuse; toothed before

* Willd. Sp. Pl. v. 4. 425. spec. 5.

Q. foliis perennantibus, coriaceis lanceolatis integerrimis, margine revolutis, basi obtusis, apice acutis subtus stellatis pubescentibus, nuce oblonga. W. RAMI teretes, fusco-cinereascentes. FOLIA breve petiolata pollicaria, vel sesquipollicaria, perennantia coriacea, lanceolata integerrima, margine revoluta reticulato-venosa, supra nitida glabra, subtus pilis stellatis dense obsita. In frutice juniore folia grosse sunt dentata, in adulto integerrima. W.

† The usual height of the live oak is about forty feet; the grain of the wood coarser, harder, and tougher than the other oaks. Upon the edges of the salt marshes, where they usually grow, they are of a large size. Their bodies are irregular, and generally long, occasioned by the looseness and moistness of the soil, and tides washing their roots bare. On higher lands they grow erect, with a regular pyramidal head retaining their leaves all the year. The acorns are the sweetest of all the others; of which the Indians lay up stores, to thicken their venison broth, and prepare them in other ways. They likewise draw an oil from them, very pleasant and wholesome, little inferior to our olive oil. *Catesby*, l. c.

before they become old ; bristly in the spring, then of a dark green colour, and slightly woolly underneath ; stalk short and reddish, as well as the nerves of the leaves.

FRUCTIFICATION. *Male flowers*, from four to five stamina ; *female flowers* with elongated penduncles ; cup turbinate, with shortened scales ; acorn oblong.

COUNTRY. From lower Virginia to Florida and the Mississipi, at a short distance from the sea.

OBSERVATIONS.

The live oak is not found in places remote from the sea—it grows abundantly in the islands, and tracts of land exposed to the tempestuous storms of the ocean. The low countries of North America are lands of a late formation, forsaken by the sea at no very distant period, considering the antiquity of the globe. The whole surface of the soil is a sandy stratum, under a very deep mass of clay. The maritime oaks make here a rapid progress, because the fibrous roots, with which they are furnished, during their very young state of growth, find in a moveable sand no difficulty of extending themselves in every direction ; and accordingly as they arrive at maturity, the principal roots reach the clayey bottom, from whence they receive nourishment, which maintains their vigour for many centuries. It is thus that they become capable of resisting the efforts

efforts of violent winds, and of enduring the heat of scorching suns. From Virginia to the extremity of Florida, the traveller often sees this species of oak standing by itself, and vigorous in a soil, where no other tree can exist. It is never injured by animals, and in all the houses situated in the low parts of both Carolinas and Georgia, the inhabitants look to it, to answer as a shelter for cattle during the winter, and to secure them from the intense heat of the summer. The leaves become very thick, and impenetrable to the rays of the sun: the shade of a single tree often covers a space of thirty fathoms, or 180 feet; the fruit, always abundant, is less astringent than many of the species of oak. The savages of Florida procure from it an oil, which they mix with their food; and hogs, and many other animals likewise seek after the acorns. Its timber is of an excellent quality, and more esteemed than that of any other species of oak which grows in North America. In the south of the United States, it is employed with the greatest advantage for building ships, which last for a considerable length of time uninjured. It is generally cut the latter end of autumn, and is not made use of for three months afterwards. Michaux observes, that the soil of lower Carolina and Georgia being the same as the lands of Bordeaux, this maritime oak merits the attention of the French and Spanish governments, as afford-

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ing the means of turning to good account the sandy lands, which border the Mediterranean and the ocean.

The name of *Bannister*, the first author who knew this oak, can only be applied to it when in a younger state; for its leaves are entire when fully grown. It happens also very frequently, that when a branch happens to be cut or broken, at this last period, the shoots, which spring up afterwards, produce on the very first year sinuated and oblong leaves, as in the young trees.

One may know this oak in the gardens of Europe, by its oblong and shining leaves, the petioles, or footstalks of the leaves, and the nerves of which are reddish. It is easily distinguished from the ever-green oak, (*Quercus ilex* of Linnæus) whose leaves are opaque, and of a dark colour.

7. QUERCUS PHELLOS. Linnæus.

Quercus foliis lineari-lanceolatis, integerrimis, glabris, apice setacco-acuminatis; junioribus dentatis aut lobatis; cupula scutellata; glande subrotunda.

1. QUERCUS PHELLOS, (*sylvatica*).

*Quercus foliis angusto-lanceolatis, utrinque acutis, deciduis. Tab. 12. Michaux. * Wangenheim, p. 76. t. 5. f. 11.*

Abbot's

* *Quercus Phellos*, Willd. Sp. Pl. v. 4. 423. Spec. 1.

Q. foliis deciduis lineari-lanceolatis utrinque attenuatis integerrimis

Abbot's Insects, v. 2. p. 181. t. 91. Catesb.
Carol. v. 1. p. 16. t. 16.

ARBORETUM, HORTUS GLASNEVINENSIS.

Chêne Saule à *feuilles* caduques.

Willow Oak.

HEIGHT from 40 to 50 feet.

BARK smooth.

LEAVES narrowly lanceolated, sharp at both ends, trifid and sometimes much divided when young, footstalk short.

FRUCTIFICATION. *Male flowers*; from 4 to 5 stamina. *Female flowers*; two on a very short peduncle. Cup slender. Acorn small.

COUNTRY. From New Jersey to Florida.

OBSERVATIONS.

tegerrimis, glabris mucronatis, nuce subrotunda. W. FOLIA fructicis junioris, vel remote grosse dentata, vel cuneata triloba. W.

Catesby, l. c. never found it but in low moist land, leaves long, narrow, and smooth-edged; in shape like a willow; the wood is soft, and coarse grained, and of less use than most of the other kinds of oak. In mild winters they retain their leaves in Carolina, but in Virginia they drop.

A variety of this species is noticed by Catesby, *Quercus humilior, salicis folio brevior*, Highland willow oak, p. 22. tab. 22. which, he informs us, is usually a small tree, having a dark coloured bark, with leaves of a pale green, and shaped like those of a willow. It grows on poor land, producing but few acorns, and those small.

Willdenow, Sp. Pl. v. 4. 424. takes notice of this variety, (var. β . of his *Q. Phellos*) and refers to Wangenheim, 77. t. 5. f. 12.

OBSERVATIONS.

This oak grows most generally in wet situations, alternately inundated by rain. Its growth is slower than other species, but when it arrives at maturity, it forms a beautiful tree. When grafted on the common oak (*Quercus Robur*) it is always more vigorous, than that which has not been grafted. The wood is good, and very much in use and succeeds well in France. In the garden of Trianon near Versailles, there exists a stump (*pied*) of this tree, which rises to about 45 feet.

2. QUERCUS PHELLOS (*maritima*.)

Quercus foliis latiuscule lanceolatis, perennantibus. Tab. 13. f. 3. *Michaux.* *

ARBORETUM, HORTUS GLASNEVINENSIS.

Chêne Saule à feuilles persistantes.

Chêne Saule *maritima*.

This differs from the former, in this particular, that its leaves do not fall, and they are very short. It is found in Carolina in the vicinity of creeks formed by the tide, and bears fruit at three feet high.

* *Quercus maritima.* Willd. Sp. Pl. v. 4. 424. spec. 2.

Q. foliis perennantibus coriaceis lanceolatis integerrimis basi attenuatis, apice acutis mucronatis, glabris, nuce subrotunda. W.

high. On close examination, perhaps it may turn out to be a new species. Michaux never cultivated it.

3. QUERCUS PHELLOS (*pumila*.)

Quercus fructiculosa: foliis oblongis, basi obtusis. Tab. 13. f. 1. 2. *Michaux*. * *Abbot's Insects*. v. 2.p. 101. t. 51.

ARBORETUM, HORTUS GLASNEVINENSIS.

Chêne Saule nain. *Chene saule stolonifere*.

We ought to consider also, as a variety of the willow-leaved oak, the *Quercus pumila* of Walter—it is very small and stoloniferous or creeping; leaves oblong, with an obtuse base, and at first view they appear to be glaucous, but on more attentive examination they turn out to be soft and silky.

8. QUERCUS CINEREA.

Quercus foliis petiolatis; lanceolato-oblongis, acutis integerrimis; subtus cinereo-pubescentibus: Cupula scutellata, squamis marginalibus introrsum manifestis; Glандe sphaerica. Tab. 14. *Michaux*. †

Chêne

* *Quercus sericea*. Willd. Sp. Pl. v. 4. 424. spec. 3.

Q. foliis deciduis lanceolatis integerrimis basi obtusis, apice, acutis subtus sericeis, nuce subrotunda, W.

† Willd. Sp. Pl. v. 4. 405. sp. 6.

Q. foliis perennantibus coriaceis lanceolatis integerrimis,
margine

Chêne Cendré.

Upland Willow Oak.

HEIGHT from 15 to 20 feet.

LEAVES petiolated, oblongly lanceolated, sharp, entire; of a dark green colour above, cinereous and downy underneath.

FRUCTIFICATION. *Male flowers*: 4 stamina. *Female flowers*, like to the willow-leaved oak. Cup; saucer-shaped, marginal scales visible within. Acorn spherical.

COUNTRY. The low part of the two Carolinas, and of Georgia.

OBSERVATIONS.

This oak is of a disagreeable form, grows only in dry and arid places, particularly on such grounds, which, having been cultivated, were deserted on account of the bad quality of the soil—its wood is used for firing only.

Linnaeus

margine revolutis basi attenuatis apice obtusiusculis mucronatis, subtus stellatim tomentosis, nuce subrotunda. W.

RAMI teretes cinerascetes remote punctati. FOLIA petiolata sesquipollicaria coriacea integerrima lanceolata, subtus pilis stellatis densissime obsita. Differt a *Quercu vivente*: foliis majoribus latioribus basi attenuatis, apice obtusis, subtus dense tomentosis, calyce fructus minus basi attenuato, et nuce subrotunda minore. In planta juniore apice dentata. W.

Linnaeus has referred to Catesby's figure and description for this species of oak, but the figure in particular is very inaccurate.

9. QUERCUS IMBRICARIA.

Quercus foliis subsessilibus, ovali oblongis, acutis integerrimis, subtus pubescentibus: Fructu præcedentis; squamis cupulæ paulo majoribus. Tab. 15. and 16. *Michaux.* *

Chêne a Lattes.

Shingles Willow Oak.

HEIGHT: 40 feet.

BARK grey, but little cracked; branches straight.

LEAVES almost sessile, large, oblong-oval, sharp, entire, of a dark green colour above, a little downy underneath.

FRUCTIFICATION. Fruit like the former species, but the scales of the cup a little larger.

COUNTRY. The Allegany mountains, and the countries to their west.

OBSERVATIONS.

The wood of this oak is made use of by the Illinois French, in preference to that of the marsh oak (*Quercus palustris* Du Roi) and which abounds in the same country. They make laths
of

* Willd. Sp. Pl. v. 4. 428. spec. 13.

Q. Foliis oblongis acutis mucronatis integerrimis subtus pubescentibus, nuce subrotunda. W.

Folia subtus pubescentia basi tantum acuta nec attenuata et *Calyce* fructus squamis magnis imbricatis composito. W.

of them, which they call *essentes* or shingles, which serve for covering their houses. On the river Wabash, and at the mouth of the Cumberland river, and in the Ohio, at 400 leagues distance from the ocean, Michaux particularly discovered this species of oak, which he observes is very rare to the east of the Allegany mountains.

10. QUERCUS LAURIFOLIA.

*Quercus foliis subsessilibus, ovali-lanceolatis, inferne in acutum angustatis integerrimis, glabris : Cupula subturbinata ; Glande subglobosa. Tab. 17. Michaux. **

Chêne Laurier à feuilles aigues.

Swamp's Willow Oak.

HEIGHT : about 60 feet.

BARK smooth ; branches straight.

LEAVES almost sessile, egg-lance shaped, contracted at the base into an acute angle, entire, smooth, and shining.

FRUCTIFICATION : Cup a little turbinate ; acorn almost globular, a little longer than that of the willow oak.

COUNTRY. Shady forests, and the sea shores in South Carolina and Georgia.

OBSERVATIONS.

* Willd. Sp. Pl. v. 4. 427. spec. 12.

Q. Foliis oblongis basi attenuatis integerrimis glabris, nucula subrotunda lævi. W.

Folia tri-vel quadripolicaria utrinque glabra Lauri. Variat foliis apice attenuatis vel obtusis. W.

OBSERVATIONS.

The wood of this oak is of a good quality; yet it does not possess all the valuable properties of the ever-green oak of N. America. It is the last, which has any affinity with the willow-leaved oak, either in the form of its leaves, or the parts of fructification.

QUERCUS LAURIFOLIA* (*hybrida*) Tab. 18.
Michaux.

Chêne Laurier à feuilles obtuses.

This species is found on the sides of brooks, which flow in arid sands—it differs from the former in the leaves being widened, with obtuse summits. One would be tempted to consider it as a hybrid species, produced by the aquatic with the laurel-leaved oak, because the same leaves are found both in the one and the other; but in the aquatic oak, they are found but accidentally on the young trees, whereas they form the essential character of this in its full grown state;
and

* The younger Michaux, in his travels to the *Westward of the Allegany Mountains, &c.*” remarks on the Tennessee side of the barrens, or meadows of Kentucky, the chain of woods is formed exclusively of this species of oak, which there is called *post oaks*, the wood of which being very hard, and not perishing easily is preferred to all others in the formation of fences; it thrives among pines in very bad soils—and again that it grows in the two Carolinas and Georgia.

and besides, it resembles in every respect the laurel-leaved oak, and is therefore evidently a variety.

11. QUERCUS AQUATICA. Catesby.

Quercus foliis obovali-cuneatis, basi acutis : summitate subintegris varievetrilobis ; glabris. Cupula modice craterata, glande subglobosa. Tab. 19. 20. and 21. *Michaux*. *

Wangenheim 80. t. 6. f. 18. Catesby's Carolina, &c. v. 1. p. 20. t. 20. †

ARBORETUM, HORTUS GLASNEVINENSIS.

Chêne Aquatique.

Water Oak.

HEIGHT : from 55 to 60 feet.

LEAVES small, wedge-shaped, sharp at the base,
summit

* Willd. Sp. Pl. v. 4. 441. spec. 45.

Q. Foliis cuneiformibus glabris apice obsolete trilobis, lobo intermedio majore calyce fructus subhemisphærico, nuce subrotunda. W. *Planta* e semine educata prima anna folia oblongo-lanceolata subintegerrima, altero ætatis anno folia oblonga integerrima, dentata, et sinuata, tertio quarto et quinto lanceolata subsinuata et triloba profert. Junior planta at Q. Phellum accedit. W.

† Grows in low watery lands, the timber is not durable, therefore of little use except for fences. In mild winters all the varieties retain most of their leaves. The acorns are small and bitter, and rejected by the hogs where others are to be found. *Catesby*, l. c. 1.

summit a little sinuated, or variously three-lobed; footstalk short.

FRUCTIFICATION. *Male flowers*: generally 5 stamina. Cup a little coneave; acorn almost globular.

COUNTRY. From Maryland to Florida.

OBSERVATIONS.

When the lobes of the leaves are obtuse, the points which terminate them fall in spring, or even when coming forth. This oak is found in large traets of ground in the low parts of the Carolinas and Georgia, which have been inundated by the rivers. It is also found in dry sandy situations, and on the downs which border the sea in Florida. It is improperly ealled aquatic, the willow-leaved oak being equally an aquatic; but Michaux thinks it would be improper to echange the names given to it time immemorial, and which have been adopted by travellers and botanists. The oaks of North America, for the most part, produce on the young trees leaves very different from those of the old ones; but there is such a sporting of nature in the varieties of the aquatic oak, that obtuse and acute leaves are often found on the same individual in their very young state; lanceolated and entire leaves, mixed with others, which are sinuated, &c. (*see plates 20 and 21. Michaux.*) Aiton in his Hortus Kewensis has distinguished many of these varieties by peculiar names, but

not being constant, they ought not therefore be adopted.

The wood of this oak is but little esteemed; it would however be very useful if it were cut, when the flow of the sap is obstructed; but this method is not practised in America, for they there cut down the trees equally in summer as in winter, in order to employ them immediately in the building of their houses and ships.

This oak has been confounded with the black species, but *Clayton*, *Catesby*, &c. who have travelled in America, distinguished the difference, as well as the people of the country.

A variety with narrow leaves, irregularly indented, and which retains them during the whole winter, is found on the sandy downs in Georgia and Florida. It is highly probable that this variety, which *Bartram* calls *Quercus dentata* (*narrow-leaved winter green oak*), and in another place *Quercus dentata*, *s. hemispharica*, ought to be referred to *Michaux's* aquatic oak. See *Bartram's Travels*, p. 14, 28, and 320.

12. QUERCUS NIGRA. *Catesby*.

Quercus foliis coriaceis, cuneatis, dilatata retuso-subtrilobis, basi retusis; subtus rubiginoso-pulverulentis: cupula turbinata, squamis apice obtuso scariosis; glande brevi ovata, T. 22. and 23. *Michaux* *

Abbot's

* Willd. Sp. Pl. v. 4. 442. spec. 46.

Abbot's Insects, p. 115. t. 58. Wangenheim, p. 77. t. 5. f. 13. Catesby's Carolina, v. 1. t. 19. *

ARBORETUM, HORTUS GLASNEVINENSIS.

Chêne Noire.

Black Oak.

HEIGHT : about 30 feet.

TRUNK tortuous ; bark rough and blackish.

LEAVES leathery, reddish and powdery underneath ; wedge-formed : base obtuse, and more or less sloping inwards, extremity very wide.

FRUCTIFICATION. *Male flowers* ; 4 stamina. *Female flowers*, almost sessile. Cup turbinate, scales with obtuse and membranous summits ; acorn oval.

COUNTRY. From Maryland to Florida. Found even in Jersey.

OBSERVATIONS.

Q. Foliis cuneiformibus glabris basi subcordatis, apice subtrilobis, lobis divaricatis mucronatis brevioribus. *Mucrones* in apice foliorum juniorum ætate decidunt. W.

* Generally grows on the land, and is small ; the colour of the bark is black, the grain coarser, and the wood of but little use but to burn ; soon produce leaves ten inches long. *Catesby*, l. c.

Speaking of the BARRENS or meadows of Kentucky, which Michaux junior considers as extremely fertile, consisting of a stratum of vegetable earth, resting on a calcareous mass, the *Quercus nigra*, black or scrub oak, and the *Juglans hickery* rising to above twelve or fifteen feet high, growing here and there in the meadows, which in the forests are evidences of the worst soil.

OBSERVATIONS.

The setaceous, or bristly points, which terminate the lobes of the leaves, generally fall off in the spring—even sometimes there are no points, when the lobes are not terminated by the protuberance, which marks out the lengthening of the nerves.

There is a variety with sharper lobes, and whose points continue—it nearly approaches the three lobed oak; nevertheless it more strongly resembles the black or the aquatic oak. Michaux found this in the state of Tennessee, at a short distance from Nashville.

In the Carolinas, Georgia, and Florida, the black oak grows in dry and sandy grounds, amongst the longleaved pines; its wood is bad, and only used for firing—often when cut down, it breaks like rotten wood.

13. QUERCUS TINCTORIA. Bartram.

*Quercus foliis petiolatis, subtus pubescentibus, lato-ovalibus, leviter et subrotunde lobatis, basi obtusis: cupula subscutellata aut turbinata; glande depresso-globosa aut ovata.**

1. QUERCUS

* *Quercus tinctoria*. Willd. Sp. Pl. v. 4. 444. spec. 51.

Q. Foliis obovato-oblongis levissime sinuatis subtus pubescentibus; lobis oblongis obtusis obsolete denticulatis setaceo-mucronatis calyce fructus subtus pleno. W.

Michaux, the younger, states that the valleys at New Jersey

1. QUERCUS TINCTORIA, *angulosa*.

Quercus foliis leviter lobatis, lobis angulosis: capula subscutellata; glande depresso-globosa, Tab. 24. *Michaux*.

ARBORETUM, HORTUS GLASNEVINENSIS.

Chêne

Jersey are particularly stocked with this Quercitron, called in the country, black oak, and it is very common in all the northern states—he says it is also found in the westward of the Allegany mountains but less plentiful in the two Carolinas and in Georgia, and that the figure given of it in his father's work, *Histoire des Chênes*, represents the leaves of the lower branches only, and the forms which they have in young trees. Among the great number of species and varieties of oaks, of which the forms of the leaves differ, according to their age, which causes them to be frequently confounded with each other; there are characteristic signs, by which the quercitron oak can always be distinguished. In all the other species, the footstalks, the nerves, and the leaves themselves are of a paler or deeper green, and towards autumn this colour becomes darker, and passes to a more or less distinct red: on the contrary, the footstalks, the nerves, and the leaves of the quercitron are yellowish from their expanding, and as if they were pulverulent, and the yellow colour becomes deeper as the winter approaches. This remark is sufficient to prevent mistakes, but there is also another more certain, and by which this species may be known in the winter, when it has lost its leaves—this is the bitter taste of the bark, and the yellow colour it communicates to the saliva, when it is chewed. Michaux thinks that he found the same property in the bark of the *Quercus cinerea*. At any rate, these two species of oak cannot be mistaken for each other; for the one grows only in the driest and most arid places

Chêne Quercitron à feuilles anguleuses.

Great black oak. Champlain black oak.

HEIGHT : from 60 to 80 feet.

BARK blackish.

LEAVES petiolated or with footstalks, widely inversely oval; lobes not very deep and angular; of a dark green above, lightly pubescent underneath.

FRUCTIFICATION. *Male flowers*: 4 stamina.

Cup almost saucer-shaped, very scaly, scales but slightly cohering. Acorn round and a little depressed.

COUNTRY. The lake Champlain, Pennsylvania, and the high mountains of both Carolinas and Georgia.

OBSERVATIONS.

The people of Pennsylvania and the high mountains call this *black oak*; but the real black oak is

places in the southern states; it rarely exceeds four inches in diameter, and eighteen feet in height, and its leaves are lanceolate; while the *quercitron* rises to the height of twenty-four feet, and its leaves have several very long lobes. He observed at the door of a tannery at Lexington some strong hides of a yellowish colour, tanned with this oak, which proves that it grows in Kentucky, though Michaux did not observe any between Lime-street and Lexington. Quercitron does not grow on arid, or extremely fertile soils; but thrives most in mountainous districts, where the land is gravelly and a little moist."

is that of Catesby, and the people of Lower Carolina, and which grows in very dry sands, whereas this grows only in good grounds, remote from the sea. Bartram measured some in Georgia, six and ten feet in diameter—what Michaux saw on the Lake Champlain were for the most part from 3 to 4 feet; but in the intervals of the high mountains of North Carolina, they acquire double that thickness. The bark of this oak is employed for tanning leather in all the northern and western parts of the United states—it affords a yellowish colour, which has got it the name of *Quercitron*, and gives a very high value to leather. This bark, bruised and reduced to powder, has been sold in France for many years to the dyers: but the war has put an end to this new branch of commerce between France and the United States.

The wood, though inferior to that of the white oak, is of wonderful resource on many occasions, besides the building of houses. *Kalm* tells us, that it is much employed for the timbering of coasting ships (*schooners*). He also speaks very favourably of this oak in his *History of Carolina*, Lond. 1719.

2. QUERCUS TINCTORIA. (sinuosa.)

Foliis profundis sinuosis; cupula turbinata; glande ovata, Tab. 25. *Michaux*.

ARBORETUM, HORTUS GLASNEVINENSIS.

Chêne

Chêne Quercitron a feuilles sinueuses.

This variety is also found in the low parts of South Carolina and Georgia, at a certain distance from the sea—the leaves are generally large and more deeply sinuated. The acorns are like those of the scarlet oak, and the cup is deeper than that of the tall black oak of upper Virginia and upper Carolina, where the specimen figured in the 24th plate of *Michaux* has been collected.

14. QUERCUS TRILOBA.

Quercus foliis petiolatis, oblonge cuneatis, summitate lobato-tricuspidibus; subtus eximie tomentosis: cupula scutellata, glande globosa.
Fig. 26. *Michaux* *

Abbot's Insects, v. 1. p. 99. t. 50?

Wangenheim, p. 78. t. 5. f. 14.

ARBORETUM, HORTUS GLASNEVINENSIS.

Chêne Trilobe.

Down Black Oak.

HEIGHT: from 50 to 60 feet; growth rapid.

BARK smooth.

LEAVES

* Willd. Sp. Pl. v. 4. 443. spec. 47.

Q. Foliis cuneiformibus apice subtrilobis, lobis æqualibus mucronatis, intermedio longiore, subtus tomentosis, calyce fructus subtus plano, nuce subrotunda. FOLIA supra viridia glabra nitida subtus dense albo tomentosa.

Q. Cuneata huic simillima et forte varietas, licet Cl. Wangenheim folia tantum pubescentia descripserit. W.

LEAVES oblong-wedge shaped, three-lobed at the top; covered (*drapees*) and ash-coloured underneath: petiolus or footstalk much longer than that of the black oak.

FRUCTIFICATION: *Male flowers*: 4 stamina. *Female flowers* almost sessile. Cup saucer-formed. Acorn globular small.

COUNTRY. From New England to Georgia.

OBSERVATIONS.

This oak is remarkable for its rapid and vigorous growth, even on bad grounds. After the conflagrations, which annually occur in America, its shoots produce during the first years, leaves very unlike those of the full grown tree—the lateral and intermediate divisions are much deeper, and the subdivisions are greatly multiplied.

It is a species of oak, which may be very usefully employed in farming enclosures of quickset hedges—a trench of about a foot broad may be prepared on the top of a ditch, in which the acorns should be sown in tolerable quantities—during the two first years, care must be taken to re-dig and weed the ground—in the course of the fourth, the young shoots must be laid down crossways (*croisees en sautoir*,) or intersecting each other; and in this manner they will form a hedge extremely close, and impenetrable, which may last for a century. Michaux advises the sowing of the acorns, as soon as possible after they have
been

been collected; but in the course of the winter rats and moles after destroy large quantities of them—this circumstance may be avoided by causing them to germinate in boxes filled with light mould, and afterwards planting them.

The wood of this tree is employed to make enclosures of a zigzag form—in order to do which, the trees are cut into pieces of two feet in length, and afterwards divided into as many parts of four inches in diameter, as the tree can afford—a first line of an indeterminate length is placed on the ground which is to be enclosed, by making the end of the second piece form a zigzag direction over that of the first: the end of the third on that of the second, &c.—afterwards another range is begun on the former, and continued to the height of 4 or 5 feet; so that the whole collection of pieces, by their extremities, forms an angle (*rentrant*,) and resembles a sheep walk. The great consumption of wood in this bad method of enclosing lands does not contribute less to the destruction of forests, than the annual conflagrations. Authors have not described this oak botanically; the following passage in *Kalm's Travels* can only refer to this species. “There is found in Pensylvania a rare species of oak, known by its leaves, having a triangular extremity, and the angles terminated by a short bristle, smooth above and hairy beneath.”

15. QUERCUS

15. QUERCUS BANNISTERI.

Quercus longe petiolatis, acutangulo-quinque-lobis, margine integris; subtus cinereo tomentosis: cupula subturbinata; glande subglobosa, Tab. 27. *Michaux*. *

Wangenheim 79. t. 6. f. 17. Abbot's Insects, v. 3. p. 157. t. 79?

ARBORETUM, HORTUS GLASNEVINENSIS.

Chêne De Bannister. Petit Chêne velouté.

Running Downy Oak.

HEIGHT: from 6 to 9 feet.

LEAVES with long petioli or leafstalks, divided into five lobes, forming as many acute angles, with a very full edge; downy and ash-coloured underneath.

FRUCTIFICATION; Fruit small: two on each peduncle or fruitstalk. Cup a little turbinated. Acorn almost globular.

COUNTRY. In the states of Massachusetts, New York, and New Jersey.

OBSERVATIONS.

Bannister's Oak grows in clayey and cold grounds, is always small, and would probably be

* *Quercus ilicifolia*. Willd. Sp. Pl. v. 4. 447, spec. 59.

Q. Foliis obovato cuneiformibus tri-quinque lobisve, lobis setaceo-mucronatis subtus tomentosis. W.

Young Michaux tells us, that, this species of oak grows on the summits of the hills at Carlisle.

be very good for quicksets, as well as the *Quercus triloba*.

16. QUERCUS FALCATA.

Quercus foliis longe petiolatis, basi obtusis, divaricatum subpalmate lobatis, lobis subfalcatis : cupula crateriformi : glande globosa, Tab. 28. *Michaux.* *

ARBORETUM, HORTUS GLASNEVINENSIS.

Chêne Velouté.

Downy Red Oak.

HEIGHT · from 50 to 60 feet.

LEAVES with elongated footstalks, obtuse at the base, palmated ; lobes slightly divided at the extremity, generally crooked like a scythe.

FRUCTIFICATION. Cup not very deep, scales deciduous ; acorn small and globular.

COUNTRY. From Virginia to Florida.

Before this tree comes to its full growth, it produces leaves, whose lateral and intermediate divisions are subdivided ; and in this state the lobes are straight, resembling much the *Q. triloba* ;

* *Quercus elongata*. Willd. Sp. Pl. v. 4. 444. spec. 50.

Q. Foliis trilobis sinuatisve subtus tomentosis, lobis subfalcatis setaceo-mucronatis, terminali elongato. Planta junior folia Q. coccinæ profert, senior Q. trilobæ simillima, adulta vero satis distincta ob lobum terminalem elongatum et laterales subfalcatos. W.

loba; that in its young state of growth it is difficult to distinguish one from the other; but when they arrive at their full state of perfection, each species assumes its peculiar characteristic marks.

17. QUERCUS CATESBÆI.

*Quercus brevioribus petiolatis, basi in acutum angustatis, subpalmato-lobatis, lobis interdum subfalcatis: cupula majuscula, squamis marginalibus introflexis; glande subglobosa, Tab. 29. 30. Michaux.**

Abbot's Insects, v. 1. p. 27. t. 14. Catesby's Carolina, &c. v. 1. p. 23. t. 23.

Chêne

* Willd. Sp. Pl. v. 4. 446. spec. 55.

Q. Foliis oblongis profunde sinuatis glabris, lobis tribus quinisque divaricatis dentatis acutis setaceo mucronatis, basi cuneatis, calycibus fructus turbinatis.

The leaves of this oak, which Catesby calls *red oak*, retain no certain form but sport into various shapes more than any other oak. The bark is dark-coloured very thick and strong, and for tanning preferable to any other kind of oak—the grain is coarse, the wood strong and not durable—grows in high lands, the acorns vary in shape, as appears by the figures of them, they being from the same kind of oak. Catesby, l. c. Michaux, jun. states that seven tenths of the two Carolinas and Georgia are covered with *Pinus palustris*, and sometimes intermixed with this species of oak, the *Quercus nigra* and *Q. obtusiloba*.

Chêne de Catesby.

Sandy Red Oak.

HEIGHT: from 30 to 40 feet.

BARK blackish and rugged.

LEAVES smooth and shining, leathery, narrowed into an acute angle at the base, with three or five lobes, which are sometimes crooked like a scythe, petiolus or leaf-stalk very short.

FRUCTIFICATION: *Male flowers*; 4 stamina: cup rather large, thickened, scales of the edge folded inwards: acorn almost globular.

COUNTRY. Maryland, Virginia, and the Carolinas.

OBSERVATIONS.

Catesby's oak grows on dry and parched uplands, and often found with the black oak; the wood is of a bad quality, and used only for firing. *Catesby* has erroneously borrowed his description from *Plucknet*, which ought to be referred to the true red oak only, (*Q. rubra* Linnæi.) known as such by *Wangenheim*, and the people of Canada. *Linnæus* has also confounded this species with the red oak.

18. QUERCUS COCCINEA. *Wangenheim*.

Quercus longissime petiolatis, 5—7 lobis: dentibusque acutissime angustatis: cupula turbinata, insigniter

insigniter squamosa ; glande brevi-ovata, Tab. 31 and 32. *Michaux.* *

Wangenheim, 44. t. 4. f. 9.

ARBORETUM, HORTUS GLASNEVINENSIS.

Chêne Ecarlate.

Scarlet Oak.

HEIGHT : from 75 to 80 feet.

LEAVES smooth, with 5 or 7 lobes, the teeth and apex of which are attenuated into a point ; sinuses much rounded, leaf-stalks very long.

FRUCTIFICATION : *Male flowers* : 4 stamina : cup turbinated and very scaly ; acorn oval.

COUNTRY. Virginia and the elevated parts of both Carolinas—rare in the more northern situations.

OBSERVATIONS.

Where this species of oak grows, it is readily distinguished by the natives from the red oak, the branches of which are much more flexible, and besides the leaves of the *Q. coccinea* are larger, and supported on very long foot-stalks—at the approach of winter they are of a tolerably deep red colour—the shape of the acorns, and particularly of the cup, affords characters so different,

* *Quercus coccinea.* Willd. Sp. Pl. v. 4. 445. spec. 54.

Q. Foliis oblongis profunde sinuatis glabris, lobis divaricatis dentatis acutis setaceo-mucronatis, calycibus fructus basi attenuatis. W.

ferent, and permanent in the scarlet oak, that they ought to be considered as two very distinct species.

The wood is preferred to that of the red oak, but the bark is less esteemed for tanning. *Wangenheim* is the first author who distinguished these two species, and the description he gives of both are exact; however he is in an error as to his figure of the acorn, which ought to be larger, as he himself confesses in his description. In general the figures of *Wangenheim* are good as to the leaves, but incorrect in what respects the fructification.

19. QUERCUS PALUSTRIS. Du Roi.

*Quercus longe petiolatis, profundius septem lobis; sinibus latis lobis oblongis, acute subdivisis: fructu parvo: cupula scutellata, lævi; glande subglobosa, Tab. 33 and 34. Michaux.**

Wangenheim, 76. t. 5. f. 10.

ARBORETUM, HORTUS GLASNEVINENSIS.

Chêne

* Willd. Sp. Pl. v. 4. 446. spec. 56.

Q. Foliis oblongis profunde sinuatis, axillis venarum subtus villosis, lobis divaricatis dentatis acutis setacco-mucronatis, calycibus fructus basi plano turbinatis. Ab affinis abunde diversa: foliis profunde sinuatis minoribus ex axillis venarum subtus villosis. W.

Chêne Des Marais,

Swamp's Red Oak.

HEIGHT: from 30 to 40 feet, very branchy, branches weeping or bending towards the ground.

LEAVES, footstalks or pctioli elongated, deeply cut and forming large sinuses, divided into seven oblong lobes, with sharp teeth or subdivisions, like those of the scarlet oak, but smaller.

FRUCTIFICATION. The same as the willow-leaved oak. Cup saucer-shaped, smooth: gland or acorn small.

COUNTRY. From New England to Virginia and the countries to the west of the Allegany mountains.

OBSERVATIONS,

This oak abounds in the Illinois country. The French who live here employ it chiefly to make spokes of wheels, stakes, posts, &c. Of all the species of American oaks, it is one of those which varies the least. The *Quercus palustris*, which Michaux saw growing in France, perfectly resembles that, which grows in Pennsylvania and in the Illinois country. The figure by Du Roi, pl. 5. f. 4. is very exact.

20. QUERCUS RUBRA. Linnaeus

Quercus longe petiolatis, glabris 7—9 lobis; lobis brevibus, dentibus angulisve acutissimis, sinibus subacutis: fructu majusculo; cupula scutellata sublævi; glande turgida ovata, tab. 35 and 36. *Michaux* *

Wangenheim, 14. t. 3. f. 7.

ARBORETUM, HORTUS GLASNEVINENSIS.

Chêne Rouge.

Red Oak.

HEIGHT: from 90 to 100 feet; its growth rapid. LEAVES sinuated, not so deeply cut as the two former species, with 7 or 9 lobes, teeth or angles very acute, sinuses likewise acute, sometimes obtuse, leafstalks or petioli very long.

FRUCTIFICATION

* Willd. Sp. Plant. v. 4. 445. spec. 53.

Q. Foliis oblongis obtuse sinuatis glabris, lobis acutiusculis dentatis acutis setaceo-mucronatis, calycibus fructus subtus planis.

The younger Michaux found a variety of the red oak at New Jersey, the acorns of which were swelled in the middle; and by the same information it appears, that the *Q. rubra*, or red oak is common in many parts of America; on the road to Carlisle and Philadelphia it occurs of very great height. He observes, that it is not known to many people in Europe, that vessels of considerable tonnage are built at Pittsburgh and on the Ohio. The timbers employed in their construction consist chiefly of this oak, the white, and the Quercitron oak.

FRUCTIFICATION: Fruit rather large: cup saucer-shaped, a little smooth: acorn oval and short.

COUNTRY. From Canada to Georgia, and all the countries to the west of the Allegany mountains.

ARBORETUM, HORTUS GLASNEVINENSIS.

It is one of the species of oak, worthy of being cultivated, and with advantage in every part of Europe. The wood, though inferior in quality to that of the white oak, is however much employed for carpentry and cartwright's work. Its bark is preferred to every other species for tanning—the European tanners settled in the United States observe, that it contains a much more active tanning principle, than the bark of the European oaks generally employed for that purpose. Michaux saw it growing from Malbaye, 28 leagues to the north east of Quebec, as far as the mouth of the Ohio; in the northern states, in Virginia, Kentucky, the state of Tennessee, and in the upper part of both Carolinas; it is more rarely to be met with in the lower parts of these two states——grows rapidly in sandy, ochry (*ferrugineux*) and cold grounds. Those, which Michaux sent from America, and which were planted at Rambouillet to the number of many thousands, grew most rapidly, arriving to the height of above 30 feet in less than ten

f 2

years;

years ; it must be observed however, that they were transplanted twice.

This oak is naturalized on the lands of *Duhamel*, for it bears fruit every year in this situation, and reproduces without cultivation.

Plucknet is the first who has given a figure of this species. *Catesby*, who knew nothing about it, has applied the synonyms of *Plucknet* to a very different species ; even the synonyms of *Linnaeus* are incorrect, because they may agree with many other species.

APPENDIX.

QUERCUS BALLOTA. *Desfontaines.*

Q. Foliis ellipticis perennantibus denticulatis integrisve subtus tomentosis, glande longissima. Desfont. Fl. Atlant. v. 2. p. 350.

Leaves ever green, elliptical, dentated or entire, downy underneath, with a very long acorn.

Q. Foliis ellipticis indivisis serratisque subtus tomentosis, cortice integro, nuce cylindracea. Willd. Sp. Pl. v. 4. 432.

ARBORETUM, HORTUS GLASNEVINENSIS.

This oak is allied to the *Quercus Ilex* of Linnaeus; and Desfontaines appears to be the first who takes notice of it—he observes that the leaves are downy and white underneath, the acorn almost twice as long, as that of the *Q. Ilex*, and which is sweet and pleasant; it likewise differs in height and habit from the last. It is distinguished from the *Quercus Suber*, or
cork

cork-tree, by the bark not being fungous or corky—by soil and by age it varies much—some are furnished with small orbicular leaves, others with elliptic leaves, and some again with lanceolate leaves. Desfontaines seems to think it is the *Quercus major* of Clusius Hist. 22. The natives of Mount Atlas eat the acorns both roasted and raw—the wood is compact and very hard, and used for various purposes. Desfont. l. c.

He quotes Pliny, lib. XVI. cap. V. “*Glandes opes esse nunc quoque multarum gentium etiam pace gaudentium constat, nec non et inopia frugum arefactis, molitur farina, spissaturque in panis usum.*”

Native of Barbary, about Algier, Belide, Mascar, Themsen, &c. and of Spain, if it be Clusius's tree.

QUERCUS GRAMUNTIA.

Q. *Foliis subrotundo-ovatis, basi cordatis sinuato-denticulatis pungentibus undulatis subtus tomentosis, antheris subrotundis.* Hortus Kewensis, v. 3. p. 355. Holly-leaved evergreen oak-tree.

Leaves roundish oval, at the base heart-shaped, sinuatedly denticulated, prickly, undulated or waved, underneath downy, with roundish antheræ or anthers.

Q. *Gramuntia—foliis subrotundo-ovatis cordatis*

datis subsessilibus, spinoso-dentatis undulatis subtus tomentosis. Willd. Sp. Pl. v. 4. 432.

ARBORETUM, HORTUS GLASNEVINENSIS.

Folia brevissime petiolata fere sessilia, coriacea, subtus levissime tomentosa, facies Ilicis aquifolii rigida, basi cordata. Synonymum Magnoli a Linnaeo indicatum ad varietatem *Q. Ilicis* spectat. Willdenow, l. c.

It is considered as hardly a distinct species from the common evergreen oak. Native of the South of France. Hort. Kew. l. c.

QUERCUS ILEX.

Evergreen, or Holm Oak-tree.

Q. Foliis ovato-oblongis indivisis serratisque subtus incanis, cortice integra, nuce ovata. Willden. Sp. v. 4. 433. *Ilex coccigera*, Blackwel. t. 186. Duhamel. Arb. v. 1. p. 314. t. 123. Tabernamont, 968.

ARBORETUM, HORTUS GLASNEVINENSIS.

Leaves oblong-oval, undivided and sawed, underneath hoary, bark entire, with an oval acorn.

Variat foliis integerrimis, subserratis, et serratis, ovatis, ovato-oblongis, et ovato-lanceolatis, subtus fere glabris incanis et tomentosis. Willd. l. c.

Professor Martyn in his edition of Miller states, that of the *Ilex* or evergreen oak there are several

ral varieties, differing greatly in the size, and the shape of their leaves; but these arise from acorns of the same tree; nay the lower and upper branches have very frequently leaves very different in size and shape, those on the lower branches being much broader, rounder, and their edges indented and set with prickles; but these on the upper long, narrow, and entire. The leaves of the *Ilex* are from 3 to 4 inches long, and an inch broad near the base, gradually lessening to a point; they are of a lucid green on their upper side, but whitish and downy on their under; stand upon pretty long footstalks, and do not fall till they are thrust off by young leaves in the spring. The acorns are smaller than those of the common oak, but of the same shape."

"The wood, says Evelyn, is servicable for stocks of stools, mallet-heads, mall-balls, chairs, axle-trees, wedges, beetles, pins, pallisadoes in fortifications; it supplies all Spain with the best and most lasting charcoal. Mr. Boucher affirms that these trees soon make lofty and warm hedges, 40 or 50 feet high; but that they should not be planted near the house or in the gardens, because they make a great litter in April and May, when they cast their leaves."

Mr. Bradley says, that the *Ilex* produces admirable timber, particularly valuable for knee timber, being much tougher than the English oak; that many ships lading of it have been brought to England; that it is of quick growth,
that

that Robert Balle, Esq. raised some thousands of these trees from acorns at Mamhead in Devonshire, some of which in 30 years have grown to a considerable size, and that within the compass of six years many millions of them have been raised in England from acorns brought from Italy and Virginia, as well as great numbers of cork-trees." The latter were killed by the frost; but what is become of the millions of *Ilexes*?"

Native of the South of Europe, and Northern Africa.

QUERCUS SUBER.

Cork Barked Oak, or Cork-tree.

Q. Foliis ovato-oblongis indivisis serratis subtus tomentosis; cortice rimoso fungoso. Willd. *Sp. Pl.* v. 4. 433. Duhamel. *Arb.* p. 202. t. 46. and 47. Blackwel. t. 193. Clusii *Hist.* 22. Lobel *Ik.* 2. p. 159. Dodon. *Pemp.* 830. *Ik.* Schaw. *Specimen.* N. 569. Regnault. *Bot. Ik.* Desfont. *Atlant.* v. 2. 348. Fusch. *Hist. Ik.* 229. Haller. *Hist. Stirp.* n. 1626.

ARBORETUM, HORTUS GLASNEVINENSIS.

Leaves oblong-oval, undivided, serrated or saw-ed, downy underneath; with the bark chapt and fungous.

Foliorum basis parum in petiolum attenuata, quod nunquam in præcedente. Willd. l. c.

Native of the South of Europe, &c. Northern Africa, particularly in Barbary where it abounds.

Professor

Professor Martyn observes, that there are two or three varieties of the cork-tree ; one with a broad leaf, a second with a narrow leaf, both evergreen, and one or two which cast their leaves in autumn ; but the broad-leaved evergreen is the most common. The leaves of this are entire, about two inches long, and an inch and a quarter broad, with a little down on their under sides, on very short footstalks ; these leaves continue green through the winter till the middle of May, when they generally fall off, before the new leaves come out ; so that the trees are almost bare for a short time. The acorns are very like those of the common oak."

The exterior bark is the cork, which is taken from the bark every 8 or 10 years ; but there is an exterior bark, which nourishes them, so that stripping of the outer bark is so far from injuring the trees, that it is necessary to continue them ; for when the bark is not taken off, they seldom last longer than 50 or 60 years in health : whereas trees, which are barked every 8 or 10 years, will live 150 years or more. The bark of a young tree is porous and good for little ; however it is necessary to take it off, when the trees are 12 or 15 years old, for without this the bark will never be good : after 8 or 10 years the bark will be fit to take off again ; but the second peeling is of little use : at the third peeling the bark will be in perfection, and will continue so for 150 years, for the best cork is taken from old trees. The
time

time for stripping the bark is in July, when the second sap flows plentifully: the operation is performed with an instrument like that, which is used for disbarking the oak."

Pliny says there were no cork-trees in France or Italy in his time. At present there are considerable woods of them in the south of France, between Rome and Naples, between Pisa and Leghorn, where all the underwood is myrtle, &c.

It would be unnecessary here to enter into the uses of cork, as being sufficiently known, for its resisting both air and water.

QUERCUS COCCIFERA.

Kermes Oak-tree.

Q. Foliis oblongis indivisis spinoso-dentatis basi cordatis utrinque glabris, squamis calycis fructus patulis. Willd. v. 4. 433. Garidel. Aix. 245. t. 53. Russel. Aleppo. t. 15. f. 2. Schaw. Specimen. n. 351. Duham. Arb. 2. p. 314. t. 125. Clusii Hist. 24. Ic. Tabernamont. Ic. 969. Lobel. Ic. 2. p. 153, *Coccus infectoria*.

ARBORETUM, HORTUS GLASNEVINENSIS.

Leaves oblong, undivided, spinously dentated, cordate at their base, smooth on both sides, with the squamæ or scales of the calyx of the acorn spreading.

Variat valde magnitudine foliorum, quæ quadrilinearia

drilinearis et sesquipollicaris occurrunt. Willdenow, l. c.

Native of Narbonne, Spain, Italy, Sicily, Istria, the East, and Judæa.

“ The Kermes oak is of small growth, seldom rising above 12 or 14 feet high (about 2 feet, *Villars*) sending out branches the whole length on every side, so as to form a bushy shrub. Leaves armed with prickles like those of the Holly. Acorns smaller than those of the common oak.”

“ The leaves resemble those of the *Ilex*, but they are less, thinner, and green on both sides.” *Villars*.

The Kermes or Scarlet grain, a little red gall, is collected from this species of oak, for the purpose of dyeing. Desfontaines relates that, although this tree abounds in Barbary, and bears a great quantity of the *Coccus Ilicis*, the insect whose puncture occasions the gall, yet it is totally neglected by the inhabitants, and the drug purchased at a high price from the French merchants for dyeing woollen red.

The Rev. Mr. Townsend's Travels in Spain, v. 3. 202, give a very full and interesting account of this oak, which the Spaniards call Cuscoja, and it grows from 12 inches to 2 feet high about Alicant. He observes that the *Grana Kermes* appear on the stems or small branches, some near the bottom, but mostly on the upper branches, yet always protected by the leaves and fixed to the

the stem by a glue, resembling thin white leather, spread over the stem, and covering, like the cup of the acorn, a segment of the grana. The agglutinating coat may be traced through a small hole into the grana, from whence it proceeds, &c. here it spreads like the placenta on the internal surface.

The grana are of various sizes from one-eighth to one-fourth of an inch in diameter, perfectly spherical, and covered with a white powder, which being rubbed off, the surface appears red, smooth, and polished. On the same stem the grana may be seen in several stages—as in tough membranes filled with a red juice resembling blood, but on paper leaving a stain as bright and as beautiful as the best carmine. In the second stage, under the first coat or pellicle is a thin tough membrane enclosing the eggs, now most minute, and scarcely to be distinguished without the assistance of a glass. Between this membrane and the pellicle is the same red liquor, but less in quantity. This pellicle is evidently separated from the inner membranes, by what seems to be the viscera and blood vessels, but near the hole these two coats adhere closely together.

The interior membrane is thin, white, and tough, with a lunar septum, forming the ovary, which at first is very small, and scarcely discernible, but progressively enlarges, till in the third stage it occupies the whole space, when the tincturing juice disappears, and only eggs are to be
seen,

seen, to the numbers of 1500 or 2000. It is clear that the grana derive no kind of nourishment from the plant, on which it is fixed; and from its position it seems that the little animal chooses the *Quercus coccifera*, which in its prickly state resembles the holly, only for the sake of shelter and protection from birds.

Besides the Kermes, there are many large red excrescences on this species of oak, some formed on the leaf, others on the peduncle of the amentaceous flowers. These morbid tumors have many perforations, communicating with little cells, which contain each a small white grub. The cell is formed by a strong membrane, but the substance of the tumor is spongy."

QUERCUS PSEUDO-COCCIFERA.

Desfontaines.

Q. Foliis oblongis spinoso-dentatis utrinque glabris, squamis calycis fructus rigidis patentibus. Willdenow, v. 4. 434.

ARBORETUM, HORTUS GLASNEVINENSIS.

Q. Foliis perennantibus glabris, oblongis rigidis brevissime petiolatis, margine serrato-spinosis, calycibus echinatis. Desfont. Fl. Atlan. v. 2. p. 349.

Leaves perennial, ovate, smooth, rigid, on very short footstalks, serrated and spinous on the margin, with an echinated calyx.

Desfontaines

Desfontaines l. c. further describes this species of oak, as a tree of 7 or 8 feet high—the leaves ovate or elliptical, shining, rigid, smooth, with very short leafstalks, slightly serrated on their margin, and the serratures spinulose, fruit sessile or on short peduncles. Calyx furnished with rigid scales, whose tips are lax or echinate. Acorn ovate and ending in a point.

Native of Algiers and Mount Atlas.

QUERCUS ESCULUS.

Italian, or small prickly cupped Oak-tree.

Q. Foliis ovato-oblongis sinuatis glabris lobis oblongis obtusis subangulatis, basi attenuatis, junioribus utrinque hirtis. Willd. v. 4. 449.

Leaves oblongoval, sinuated and smooth, the lobes oblong, obtuse, somewhat angled, thinned at their base, in their younger state hairy on both sides.

Folia pinnato-partita fere ad costam marginatam : laciniis remotis, lanceolatis, acutis, postice inprimis angulatis ; subtus etiam nuda.

Fructus mihi ignotus. Willdenow, l. c.

Native of the south of Europe.

ARBORETUM, HORTUS GLASNEVINENSIS.

“ The leaves of the Italian oak are smooth and deeply sinuated ; some of the sinuses are obtuse, and others end in acute points : they are on very short footstalks : the branches are covered with

with a purplish bark when young : the acorns are long and slender : the cups rough and a little prickly, sitting close to the branches. The acorns are sweet and frequently eaten by the poor in the south of France : in times of scarcity they grind them and make bread with the flour." *Martyn's Miller's Dictionary.*

QUERCUS ROBUR. *Willdenow.*

Sessile fruited Oak.

Q. Foliis oblongis petiolatis glabris sinuatis, lobis rotundatis, fructibus oblongis sessilibus. Willdenow, v. 4. 450.

Q. (*sessiliflora*) foliis petiolatis deciduis oblongis, sinubus acutioribus oppositis, fructibus sessilibus. Smith. Fl. Brit. v. 3. p. 1026, 1027. Eng. Bot. v. 26, 1845. Martin. Fl. Rust. t. 11. var. *sessilis*. Bauhin. Hist. 1. 70. t. 1.

Leaves with footstalks, deciduous, oblong, sinuses acute and opposite ; with *sessile* fruit, or without a peduncle or fruitstalk.

Doctor Smith, English Botany, l. c. observes that this is fortunately much less common than the *true British oak*, which I shall next consider, as its timber is far less strong and durable, but however found in most parts of England. It is known by its leaves being more regularly and oppositely sinuated, which gives the tree a neater and more chesnut-like aspect, with generally longer footstalks ; but especially by the female
flowers

flowers, and consequently the acorns, being sessile. It is said to be somewhat later in flowering, and the leaves are commonly more permanent. Sometimes they are downy underneath, as in specimens sent by Mr. W. Berrer, and Mr. Lynell from Sussex, which variety is called the Durmast oak. This abounds in the New Forest, and above Goodwood, near Chichester; but however desirable in home plantations, it is to be rejected from all plantations for valuable purposes, and the *true Q. Robur should be carefully preferred*. Professor Martyn, whose *Flora Rustica* contains a full account of these trees, has only erred in considering the common smooth-leaved state of *Q. sessiliflora* as belonging to the *Robur*, misled, as it seems, by the occasional footstalks of the leaves.

QUERCUS PEDUNCULATA. Willdenow.

Common British Oak.

Q. Foliis oblongis subsessilibus glabris sinuatis, lobis rotundatis, fructibus oblongis pedunculatis. Willd. Sp. Pl. v. 4. 450.

Q. (Robur) foliis deciduis oblongis superné latioribus; sinubus acutioribus: angulis obtusis, pedunculis fructiferis elongatis. Fl. Brit. Smith, v. 3. p. 1026. Eng. Bot. v. 19. t. 1342. Woodvill. Med. Bot. ed. alt. v. 1. p. 23. t. 10.

Martin. Fl. Rust. t. 10. *var. pedunculatis.* Fl.

Danica t. 1180. Duhamel. Arb. v. 2. t. 47.
Hunt. Evel. Sylv. tab. ad. p. 69.

ARBORETUM, HORTUS GLASNEVINENSIS.

Leaves deciduous, oblong, broad at the top; sinuses or indentures acute; angles obtuse, with elongated fructiferous peduncles or fruitstalks.

Doctor Smith observes that the wood of this species is of more consequence and bears a higher price than the former, the wood being highly useful, hard, and tough. In the former the leaves are furnished with footstalks, and more regularly and equally pinnated or winged—in this species they are alternate, rather sessile, oblong oval, sinuated, with the lobes obtuse; on their upper side smooth and shining; on their under pale and somewhat of a glaucous or sea-green colour.

And again in Eng. Bot. l. c. he observes that this is the most common, growing every where in woods and hedges, and its timber is also the best—growing to a large size, rich and picturesque in form of foliage—flowers early in April—the leaves are deciduous, alternate, nearly sessile, somewhat obovate, but deeply sinuated, with obtuse lobes; smooth and shining above, a little glaucous beneath. Male flowers in slender pendulous stalked yellow clusters—female 3 or 4 on a long stalk—the calyx of the latter is entire, scaly, and becomes the well known cup of the nut or acorn. Few plants nourish more insects.

Mr.

Mr. Miller seems to think that this species is not so common as the former, his *Q. Robur*, but in the wilds of Kent and Sussex there are many large trees of it; he observes that the leaves in this species are not so deeply sinuated, nor are they so irregular, but the indentures are opposite; they have scarce any footstalks, but sit close to the branches; but the acorns stand upon very long footstalks. The timber of this is accounted the best, and the trees when growing have a better appearance.

Professor Martyn observes, that Miller is mistaken in affirming that the tree, which bears sessile acorns, is the most common oak of England, and in referring us only to the wilds of Kent and Sussex for the other. This mistake has been copied by Dr. Hunter in his edition of Evelyn's *Sylva*."

Du Roi affirms that the timber of the stalk-fruited oak is whitish and hard; whereas that of the other is reddish and brittle. If this should turn out to be the case, it behoves planters of oak for timber to attend to the distinctions given, and to avoid gathering acorns for planting from such trees as have the leaves or footstalks with sessile fruits. *Martyn's Fl. Rustica*, 10.

The wood of this oak, when of a good sort, is well known to be hard, tough, and tolerably flexible, not easily splintering, strong without being too heavy, and not easily admitting water; for these excellent qualities it is preferred before

all other timber for ship-building. It is also adapted to almost every purpose of the carpenter; indeed it would be difficult to enumerate all the uses, to which it may be applied. There is a kind of it, says Evelyn, so tough and compact, that our sharpest tools will hardly enter it. Though some trees be harder, yet we find them more fragile, and not so well qualified to support great weights, nor is there any timber more lasting, which way soever used.

QUERCUS PUBESCENS. Willd.

Q. Foliis oblongis-ovatis petiolatis sinuatis subtus pubescentibus, lobis obtusis angulatis, basi subcordatis. Willd. Sp. Pl. v. 4. 451. Secondat. Mem. du Chêne, p. 3. t. 5, Chêne noir.

QUERCUS SESSILIFLORA, var. β . Smith Fl. Brit. 3. 1027.

ARBORETUM, HORTUS GLASNEVINENSIS?

Durmast Oak. Mart. Fl. Rust. v. 1. t. 12.

In the New Forest, England. Martyn.

Leaves oblong-oval with footstalks, sinuated, pubescent underneath, lobes obtuse and angled, at their base somewhat heart-shaped.

Species distinctissima, similis Q. Robori sed abunde diversa; *statura* minori, *foliis* minoribus subtus pubescentibus, vernantibus albido-lanuginosis, *basi* subcordatis, *fructibus* minoribus.

Q. pubescens

Q. pubescens in meo arboreto Beroliniensi 279. descripta est *Q. albæ* varietas, folia majora basi attenuata habet. Willden. l. c.

This is a very distinct species, though like the *Q. Robur*, but differing in many respects, it is not near so tall, the leaves small, and their under sides pubescent, when flourishing covered with a woolly whiteness, somewhat heart-shaped at their base, and the fruit smaller. *Q. pubescens* described in Willdenow's Berlin Arboretum, p. 279, is a variety of the *Q. alba*, which has larger leaves attenuated or thinned at their base.

Native of England, France, Austria, Hungary, and Turin.

QUERCUS DENTATA. Thunberg.

Q. Foliis ovato-oblongis obtusis inciso-dentatis subtus tomentosis. Willd. Sp. Pl. v. 4. 452.

Leaves oblong-oval, obtuse, tooth-cuted, underneath downy.

Caulis arboreus. *Rami et ramuli* crasse sulcati, punctis nodulisque muricati, summi tomentosi erecti. *Folia* in apicibus aggregata brevissime petiolata obovato-oblong obtusa inciso-dentata inermia parallelo-venosa, supra villosa, subtus tomentosa mollia bipollicaria. Thunberg Fl. Japan, 177.

ARBORETUM, HORTUS GLASNEVINENSIS?

Small and large branches thick, sulcated or grooved, muricated or prickled with little dots
and

and knobs, the upper ones downy and erect. Leaves aggregated or in clusters at the ends of the small branches, on very short footstalks, of an inversely oblong-oval shape, obtuse, tooth-cuted, unarmed or without spines, with parallel nerves, villous on their upper, downy on their under sides, soft, and two inches long.

Native of Japan.

QUERCUS TOURNEFORTII. Willdenow.

Q. Foliis oblongis pinnatifido-sinuatis subtus tomentosis basi rotundatis, lobis lanceolatis acutiusculis integerrimis distantibus, calycibus fructus hemisphæricis echinatis pubescentibus. Willdenow, 4. 453.

ARBORETUM, HORTUS GLASNEVINENSIS?

Leaves oblong, pinnatifidly or wingedly sinuated, downy underneath, rounded off at their base, lobes lanceolated somewhat acute, distant and very entire; the cup of the acorn hemispherical echinated and pubescent.

Differt abunde a Q. cerri FOLIIS profunde pinnatifidis, lobis distantibus, integerrimis, subtus albo-tomentosis, FRUCTU majori. Willdenow, l. c.

Differs very much from the Q. cerris in the leaves been deeply winged, the distant and very
entire

entire lobes, covered with a downy whiteness, and the acorn being larger.

Native of Armenia.

QUERCUS CERRIS.

Turkey Oak.

Q. Foliis oblongjs pinnatifido-sinuatis subtus hirtis, basi angustatis, lobis oblongo-lanceolatis dentatis, calycibus fructibus hemisphæricis echinatis. Willd. Sp. Pl. 4. 454. Du Roi Harbk. 2. p. 259. t. 5. f. 1. Willd. Arb. 280.

· ARBORETUM, HORTUS GLASNEVINENSIS.

Leaves oblong-oval, pinnatifidly sinuated, hairy underneath, narrowed at their base, lobes oblongly lance-shaped, dentated, with the cups of the acorn hemispherical and echinated.

Many linear rammenta from the axilla of the leaves.

Leaves oblong and pointed, and frequently lyrate; jagged and acute pointed, a little hoary on their under side, and stand on slender foot-stalks. The acorns are small, and have rough prickly cups. *Martyn's Miller.*

Aiton's *Hortus Kewensis*, v. 3. 359. takes notice of some varieties. The *Lucombe* or Devonshire oak is supposed to be one, see 62d vol. of Philosophical Transactions.

Mr.

“ Mr. Gilpin, *Forest Scenery*, v. 1. 97. says, it is nearly an evergreen, named from the person who raised it, produced from an acorn of the common Turkey oak, from which all have been grafted. It is said the growth is rapid; but from few trees, and those but young, no judgment can be well formed.”

Native of Spain and France.

QUERCUS AUSTRIACA. Willdenow.

Q. Foliis oblongis levissime sinuatis subtus pubescentibus basi angustatis, lobis brevissimis obovatis acutiusculis integerrimis, calycibus fructus hemisphæricis echinatis. Willdenow. 4. 454. Clus. Hist. 1. p. 20. *Cerrus*.

ARBORETUM, HORTUS GLASNEVINENSIS.

Leaves oblong, very delicately sinuated, pubescent underneath, narrowed at their base; lobes very short inversely oval, somewhat acute and very entire, with the cups of the acorn hemispherical and echinated.

Forma foliorum fere ut in Q. Robore sed subtus pubescentia. Differt a præcedente qua cum fructu convenit: FOLIIS levissime sinuatis, lobis ovatis integerrimis totoque habitu, nec est varietas hujus, Willdenow, l. c.

Very like the Q. Robur in the form of its leaves, but in this species they are pubescent underneath. It differs from the Q. Cerris, with which it agrees
in

in the shape of its fruit, but the leaves are very slightly sinuated, the lobes oval and very entire throughout, neither is it a variety of this species.

Native of Austria, Hungary, and Carniola.

QUERCUS,

OR,

O A K S:

FROM

WILLDENOW.

† foliis integerrimis.
with very entire leaves.

SPECIES	NATIVE PLACES OF GROWTH.
1 Quercus Phellos - -	North America.
2 ——— maritima - -	Maritime situations Carolina.
3 ——— sericea - -	Carolina and Georgia.
4 ——— myrtifolia -	Carolina.
5 ——— virens - -	Along the sea shore from Virginia to Florida.
6 ——— cinerea - -	Carolina and Georgia.
7 ——— microphylla	On the mountains of Alcam- baro S. America.
8 ——— salicifolia -	In Mexico near Acapulco.
9 ——— glabra - -	Japan.
10 ——— concentrica -	High woods in Cochinchina.
11 ——— molucca - -	Molucca islands (Celebes and Formosa.
12 ——— laurifolia - -	South Carolina and Georgia.
13 ——— imbricaria -	Allegany mountains N. Ame- rica.

- 14 *Quercus elliptica* - - On the roads leading from Ixmiquilpan to Cinapan, and from Tixtala to the river Azul, Mexico.
- 15 ——— *acuta* - - Japan.
- 16 ——— *magnoliæfolia* In the same situation as the *Q. elliptica*.
- 17 ——— *lutea* - - Mexico.

†† *foliis dentatis*

dentated, or toothed leaves.

- 18 ——— *glauca* - - Japan.
- 19 ——— *cuspidata* - - Japan.
- 20 ——— *serrata* - - Fakonian mountains, Japan.
- 21 ——— *diversifolia* - - Near the villages of Chalm and Sancta Rosa America.
- 22 ——— *agrifolia* - - Eastern shores near Monterey and Nootka, N. America.
- 23 ——— *gramuntia* - - South of France?
- 24 ——— *Ballota* - - Barbary.
- 25 ——— *Ilex* - - South of Europe, and North Africa.
- 26 ——— *Suber* - - South of Europe and North of Africa.
- 27 ——— *coccifera* - - Narbonne, Spain, Italy, Sicily, Istria, the East, and Judæa.
- 28 ——— *Pseudo-coccifera* - - Algiers and Mount Atlas.
- 29 ——— *rigida* - - Sea shores Caramania.
- 30 ——— *rotundifolia* Spain.
- 31 ——— *humilis* - - Sandy and gravelly situations, Portugal.
- 32 ——— *Lusitanica* - - Portugal.
- 33 ——— *infectoria* - - In the East.
- 34 ——— *mucronata* S. America between Ixmiquilpan and Cinapan.

- 35 *Quercus tomentosa* On the road from Acapulco to Mexico, beyond the river Mescal.
- 36 ——— *circinata* S. America, between Tixtala and Chilpancingo.
- 37 ——— *splendens* Neighbourhood of Tixtala, S. America.
- 38 ——— *rugosa* - Woods of Huisquiluca and Ocuila, on the road from Mexico to Santo Christo de Chalma.
- 39 ——— *macrophylla* Chilpancingo, la Curva, and mountains Quirapu, S. America.
- 40 ——— *Prinus* - Pensylvania, Virginia, Carolina, Florida, in shady wet situations.
- 41 ——— *Prinoides* Pensylvania, Virginia, Carolina.
- 42 ——— *montana* - On the high mountains Virginia and Carolina.
- 43 ——— *bicolor* - In flat situations Pensylvania, Virginia, and Carolina.
- 44 ——— *Castanea* Allegany mountains

††† foliis apice lobatis.

leaves lobed at their apex.

- 45 ——— *aquatica* - Wet situations from Mariland to Florida.
- 46 ——— *nigra* - - Pensylvania, Virginia, Carolina, and Florida.
- 47 ——— *triloba* - From New England to Georgia
- 48 ——— *nana* - Carolina.

†††† foliis

++++ foliis sinuatis, lobis mucronatis.

leaves sinuated, with the lobes bristle-pointed.

- | | | |
|----|-----------------------------|---|
| 49 | <i>Quercus hemisphærica</i> | Georgia and Florida. |
| 50 | — <i>elongata</i> | - Virginia, Carolina and Florida. |
| 51 | — <i>tinctoria</i> | - Pennsylvania and the high mountains Carolina. |
| 52 | — <i>discolor</i> | - Virginia, and Carolina. |
| 53 | — <i>rubra</i> | - From Canada to Carolina. |
| 54 | — <i>coccinea</i> | Virginia and Carolina. |
| 55 | — <i>Catesbæi</i> | Maryland, Virginia, and Carolina. |
| 56 | — <i>palustris</i> | - New England, Pennsylvania, and Virginia. |
| 57 | — <i>acutifolia</i> | - On the road from Acapulco to Mexico. |
| 58 | — <i>candicans</i> | In the sands near Tixtala, S. America. |
| 59 | — <i>ilicifolia</i> | - Sandy places Nova Boraco and Nova Cæsaria N. America. |
| 60 | — <i>Pseudo-suber</i> | Mountains in Spain, Barbary, and Tuscany. |
| 61 | — <i>Ægilops</i> | - Spain, and in the East. |

++++ foliis sinuatis, lobis muticis.

sinuated leaves, without bristles on the lobes.

- | | | |
|----|----------------------|--|
| 62 | — <i>alba</i> | - - From Canada to Florida. |
| 63 | — <i>Esculus</i> | - South of Europe. |
| 64 | — <i>Robur</i> | - - Woods throughout Europe. |
| 65 | — <i>pedunculata</i> | Woods throughout Europe. |
| 66 | — <i>pubescens</i> | England, France, Austria, and Hungary. |
| 67 | — <i>pyrenaica</i> | Pyrenees. |

- | | | | | |
|----|----------------|---------------------|---|--|
| 68 | <i>Quercus</i> | <i>faginea</i> | - | Spain and South of France. |
| 69 | ———— | <i>dentata</i> | - | Japan. |
| 70 | ———— | <i>lobata</i> | - | South America, |
| 71 | ———— | <i>stellata</i> | - | Canada, New England, Pen-
sylvania, Carolina. |
| 72 | ———— | <i>lyrata</i> | - | Banks of rivers, S. Carolina and
Georgia. |
| 73 | ———— | <i>macrocarpa</i> | | Alleghany mountains, Kentucky
and Tennessee. |
| 74 | ———— | <i>Tournefortii</i> | | Armenia. |
| 75 | ———— | <i>Cerris</i> | - | Spain and France. |
| 76 | ———— | <i>Austriaca</i> | | Austria, Pannonia, and Car-
niola. |









